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BY

NORMAN TAYLOR

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# THE TORREY BOTANICAL CLUB




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# THE HAWAIIAN VIOLACEAE

By Vaughan MacCaughey

The Violaceae are represented in the Hawaiian flora by 14 species and varieties—11 in the genus *Viola* and 3 in *Isodendrion.* It is noteworthy that these are all endemic, ligneous, and shrubby. The genus *Isodendrion* Gray is endemic. Most of the species and varieties are highly precinctive and give evidence of having been members of the Hawaiian flora for a very long time.

The Hawaiian violets have been studied by a number of taxonomists, as is indicated by the following select bibliography:

1826 Gingins in Linnaea I: 408
1854 Gray in Botany of the U. S. Exploring Expedition
1866 Mann in Enumeration of Hawaiian Plants
Flora of the Hawaiian Islands
1888 Hillebrand in Flora of the Hawaiian Islands
1897 Heller in Plants of the Hawaiian Islands
1908 Forbes in New Hawaiian Plants
1909 Forbes in New Hawaiian Plants
1911 Rock in Notes upon Hawaiian Plants.

Practically all of this material is very rare and inaccessible outside of large botanical libraries.

The present paper is, however, the first comprehensive account which has included all of the recorded species and varieties. It is based upon field work extending over nearly ten years and contains new ecological material.

The genus *Viola* comprises about 200 species, widely distributed throughout the world, but most abundant in temperate regions. The tribe Violae, to which *Viola* belongs, occurs chiefly

[No. 12, Vol. 17 of Torreya, comprising pp. 207–242, was issued 24 January, 1918.]

in Europe, Siberia, and North America; the woody species, of which the Hawaiian forms are representative, are mainly natives of tropical America. The Violas are leafy-stemmed or stemless herbs, or small shrubs; the Hawaiian species sometimes reach a height of 6 feet. The leaves are alternate, with persistent stipules. Most species produce two sets of flowers. The early set is showy, petaliferous, often fragrant, and usually sterile. This is succeeded by a set of cleistogamous flowers that are usually without petals, and never expand, but bear abundant seed. These small apetalous cleistogamous flowers are very fertile and quite diverse in structure, and are of great taxonomic value. The 5 imbricate, persistent sepals are generally produced at the base below their insertion. The 5 petals are unequal, the lowest one spurred, forming a nectar sac. The 5 stamens are hypogynous, alternate with the petals, and on short filaments or subsessile. They closely surround the ovary, with their connective prolonged beyond the apex; the 2 lowest with appendages that project into the spur. In the cleistogamous flowers these two stamens alone develop.

The ovary is simple, 1-celled, with 3 parietal placentae. The capsule is 3-valved, loculicidal, and opens elastically when mature. The valves spring back and at the same time fold on the middle, so that the seeds are forcibly ejected. The seeds are anatropous, with a hard testa and copious albumen; ovoid-globose; embryo straight, axile; cotyledons flat.

It is well known that allied species of *Viola* hybridize freely when growing together, and it is possible that some of the Hawaiian forms have originated in this way. The hybrids commonly display characters which are more or less intermediate to those of the parent species. The offspring of the hybrids are frequently much unlike the parent stock and unlike each other, and revert to the characters of the two original species.

The Hawaiian Violas, like those of other parts of the world, contain an alkaloid which possesses emetic and laxative properties. Several species were used medicinally by the primitive Hawaiians for skin diseases, as emetics, etc.

The endemic genus *Isodendrion* is distinguished from *Viola* by the fact that the petals are equal, not spurred, and the anthers are not appendiculate. The three species, which strongly resemble the true violets, are shrubs with entire leaves and persistent, rather intrapetiolar, keeled stipules. The flowers are small, axillary, solitary, and shortly pedicellate. The sepals are equal, persistent. The petals are nearly equal, linear-spathulate; the long claws erect and contiguous, the broader blades spreading, imbricate. The filaments are short, distinct, the anthers connivent around the ovary, their connective neither spurred nor prolonged above. The style is elongate, slightly curved and thickened near the apex, with anterior stigma. The capsule is coriaceous, surrounded by the withered corolla, 3-valved, the placentae along the middle of the conduplicate valves, with 2–4 seeds. Seeds obovoid, smooth, crustaceous.

*Viola* and *Isodendrion* are distributed rather generally throughout the larger islands of the archipelago, both in the montane rain-forests and summit bogs, and in semi-arid districts. The range by islands is shown in the following table:

| Name | Kauai | Oahu | Molokai | Maui | Lanai | Hawaii |
|---|---|---|---|---|---|---|
| 1. *Viola Chamissoniana* | * | * | * | * | | |
| 2. *Helena* | * | | | | | |
| 3. var. *Laniaensis* | | | | | * | |
| 4. *helioscopa* | | * | | | | |
| 5. *Kauaiensis* | * | | | | | |
| 6. *Mauiensis* | | | * | * | | |
| 7. var. *Kohalana* | | | | | | * |
| 8. *Oahuensis* | | * | | | | |
| 9. *robusta* | | | * | | | |
| 10. var. *Mauiensis* | | | | * | | |
| 11. var. *Wailenalenae* | * | | | | | |
| 12. *Isodendrion pyrifolium* | | * | | | | |
| 13. *longifolium* | * | * | | | | |
| 14. *laurifolium* | | * | | | | |
| Totals | 5 | 6 | 3 | 3 | 1 | 1 |

It will be noted from the above table that the older islands, to the west, are richer in species and varieties than are the relatively younger islands to the east. Kauai and Oahu possess 9 forms; Maui and Hawaii but 4. Ten species and varieties are strongly hygrophytic; 4 have been recorded from semi-xerophytic habitats. The ecologic range is striking; on one hand are the excessively humid summit bogs, on the other the dry, open, exposed, wind-beaten ridges and foothills.

| *Hygrophytic* | *Xerophytic* |
|---|---|
| *Viola Chamissoniana* | *Viola helioscopa* |
| *Helena* and var. *Lanaiensis* | *robusta* var. *Mauiensis* |
| | *Isodendrion pyrifolium* |
| *Kauaiensis* | *laurifolium* |
| *Mauiensis* and var. *Kohalana* | |
| *Oahuensis* | |
| *robusta* and var. *Wailenalenæ* | |
| *Isodendrion longifolium* | |

The vertical range extends from 1,000 to 6,000 feet. On the very high mountains of Maui and Hawaii (8,000 to nearly 14,000 feet) they rise to higher levels, as do many other plants of the middle and lower forest zones.

## Descriptions of the Species

The following descriptions have been taken from the original sources, with emendation, revision, and additional material.

1. *Viola Chamissoniana* Gingins. Described in Linnaea I: 408, 1826.

An erect, branching shrub, 3–5 feet high. Stem woody, fine-grained, ½–1 in. thick. Branches diffusely foliose. Stipules dark, scarious, 2–4 lines, broadly deltoid, entire and long-acuminate, or glandular-dentate. Petioles 1–2 in. Blade cordate, those of the upper leaves rarely ovate, 3–6 in. by 1–2½ in.; dentate with appressed callous teeth, chartaceous, glabrous.

Peduncles 1 or 2 to a branch, ½–1½ in. long, with 2 subulate bracts above the middle; single-flowered, the flowers large and handsome. Sepals narrow lanceolate, 2–4 lines, shortly pointed at the base. Petals pink, rose, or purplish, twice as the sepals long or more, oblong-spathulate; the lowest petal deeply saccate. Anthers 1 line long, with narrow connective and short, broad terminal appendage; the 2 lowest anthers with a long, broad, obtuse spur. Capsule 6 lines long, with 6–8 obovoid, blackish seeds in each placenta.

Dimorphism is indicated by the occasional occurrence of well-developed diminutive flowers not exceeding 3 lines in length, with petals scarcely longer than the sepals.

Occurs on all the islands, except possibly Hawaii, at elevations of 1,000–4,000 ft. in the rain-forests. Native name "*Pamakani.*"

Var. *beta* Hillebrand, Flora, p. 17, 1888, has the young shoots and inflorescence puberulous with a silvery-gray tomentum; old leaves pubescent. Leaves serrate with uncinate teeth; stipules large, 6 lines long; flowers whitish. Confined to the Wai-ale-ale rain-forests of Kauai, at about 3,000 feet. Native name "*Olopu.*"

2. *Viola Helena* Forbes. Described in Occ. Papers Bishop Museum, vol. 4, no. 3, 1908, p. 42 and plate.

"Plant 1–2 feet high. Leaves lanceolate, tapering at both ends, glandular-serrate, 3–4½ lines long by 7–9 lines wide, with petioles of 2–3 lines.

"Scapes or peduncles 1 or 2 on a stem, 2–3 lines, with 2–3 linear bracts, bearing an umbel of 2 flowers on pedicels of 10–14 lines which have bractlets of about 1 line. Sepals lanceolate, 2 lines long. Petals a little more than twice as long, the lower saccate, white or pale lavender, the lower and lateral ones bearded. Capsule glabrous, 7 lines long."

Recorded only from the Wahiawa Mountains of Kauai; hygrophytic.

3. *V. Helena* var. *Lanaiensis* Rock. Described in College of Hawaii Bulletin 1, 1911, p. 6.

"Caudex erect, 3 dm.–13 dm. long, woody, hollow, foliose at the apex. Leaves oblong-lanceolate, about 1 dm. × 12–18 mm., acuminate at both ends, on somewhat margined petioles of 5 mm . serrate with callous teeth; bluish-purple when young, light green with pellucid oil-dots when old; stipules lanceolate, 1 cm. long, caudate-fimbriate, blackish, with a prominent median vein.

"Peduncles bi-bracteate, 1.5 cm. with a bi-bracteolate pedicel of 4.5 cm. long, bearing a single small, pinkish-white flower; sepals lanceolate, not saccate. Capsule lanceolate, 12 mm. long; seeds ovoid, blackish."

Recorded only from the island of Lanai, 2,000–3,200 feet; hygrophytic.

4. *Viola helioscopa* Hillebrand. Described in his Flora of the Hawaiian Islands, 1888, p. 17.

An erect shrub, 2–3 feet high, with a few slender wand-like branches foliose at the top. Stipules deltoid-subulate, fringed with long, glandular fimbria. Leaves coriaceous, glabrous, ovate, 1–1½ in. long by 1 in. wide, acuminate, serrulate; the truncate base passes abruptly into a petiole of 2–4 lines.

Peduncles generally 2 to a branch, ascending, 1½–2 in. long. Each bears a single large, erect, showy flower, and is bi-bracteolate a short distance from the calyx. The sepals are narrow-lanceolate, 4 lines long, drawn out at the base into a short appendage. The petals are 8–14 lines long, broad-oblong or orbicular, on long claws, the lowest petals saccate; color pure waxy white. Capsule 6 lines long; seeds dark.

Recorded only from the Waianae Range of Oahu, on dry, open, semi-xerophytic ridges. A very handsome species, worthy of horticultural experimentation.

5. *Viola Kauaiensis* Gray. Described in the Botany of the United States Exploring Expedition, 1854, p. 85.

Stem either short and erect, or a creeping or trailing rhizome which may be more or less subterranean. Rhizome 2–3 lines in diam., scaly near the apex with obtuse stipules, and bearing (besides the remnants of older ones) 1 or 2 slender scapes 4–8 in. long. These scapes have 1 internode and a single leaf and flower, or with 2 internodes and a second leaf and flower. Petioles slender, 2–6 in. long. Blade broadly ovate, orbicular, or reniform, with a cuneate base, less than 1 in. diam., rather thick with prominent subflabellate veins; margin crenate, surface glabrate. Stipules deltoid, 2–3 lines long, with a few short teeth.

Petaliferous flowers on peduncles of 2–4½ in., which bear a pair of short subulate bracts in the upper portion. Sepals 3½ lines long, narrow-lanceolate, the base produced into a short appendage. Petals twice as long, pale blue, not bearded, oblong-spathulate, the lowest one slightly saccate. Anthers free, half as long as the sepals, attached to the anterior face of a broad connective which fringes them and extends above in the shape of a hood. The 2 lowest anthers have a short dorsal keel near the base. Style curved, clavate above, with anterior stigma. The smaller flowers have petals not exceeding the calyx; stamens with distinct filaments nearly equalling the petals; style thicker and hooked. Capsule acute, 5–6 lines long, with 8–10 seeds in each placenta.

Recorded only from the swamps on the upper slopes and summit of Wai-ale-ale, Kauai, 4,000—5,250 feet. It grows in the shade of the stunted *lehua* trees (*Metrosideros polymorpha*) that are characteristic of these swamps, and also epiphytically on the moss-covered tree-trunks. It is strongly hygrophytic. Native names "*Pohehiwa*" and "*Kalili*."

6. *Viola Mauiensis* Mann. Described in Enumeration of Hawaiian Plants, no. 11, 1866.

Stem simple, or dividing at the base, prostrate or ascending, woody below, a few inches to 2 feet long. Its upper portion is covered with dark brown, sharply cut, long-acuminate stipules, and foliose near the apex. Leaves on petioles of about 1 inch, coriaceous, glabrous, broadly ovate and obtuse or rounded, 1–1½ in. diam., truncate or cuneate at the base, serrulate with callous teeth.

Scapes or peduncles 1–3 on a stem, 2–6 in. long, with 2 narrow acute bracts about the middle, bearing an umbel of 2–4 flowers on pedicels of 1 inch, which are again bracteolate. Sepals narrow-lanceolate, 4 lines, purplish, scarcely produced at the base. Petals twice as long, unguiculate, obovate, dark blue, the lowest saccate. Anthers oblong, 1–1½ lines long, not margined, tipped with a short papilla, the 2 lowest broadly spurred. Style curved, thickening toward the stigma. Capsule 6 lines long, with 8–10 seeds to the placenta.

Characteristic of the summit bog of West Maui, but also recorded from the Kawela swamps of East Molokai, 4,000 feet. Strongly hygrophytic.

7. *V. Mauiensis* var. *Kohalana* Rock. Described in College of Hawaii Bulletin 1, 1911, p. 5.

"Caudex 10–16 dm. long, woody, more or less prostrate. Stipules ovate-lanceolate, reddish-brown. Leaves like the species, on petioles of 2–7 cm. Peduncles blackish-blue when with dark blue flowers, light yellow when with white flowers; bearing umbels of blue or white flowers on bi-bracteolate pedicels of 3–9 cm. length; capsules as for the species."

Recorded only from the summit bogs of the Kohala Mountains, island of Hawaii, at altitudes of 4,600–5,200 feet. "The flowers are very fragrant and large, the dark blue-flowered specimens occurring down to an elevation of 4,600 feet, while the white ones are found only higher up, 5,200 feet elevation. . . . This variety differs from the species in its very long caudex, scapes, and petioles, as well as pedicels and in its large flowers which are also white." It grows both in the swampy soil and epiphytically on mossy tree-trunks.

8. *Viola Oahuensis* Forbes. Described in Occ. Papers Bishop Museum, vol. 4, no. 3, 1909, p. 40 and plate.

"Stem erect, simple or sparingly branched, 6 in. to 1 foot high. Leaves 4.5–5 × 2–2.25 in., ovate, uneven-sided, glandular-serrate, acute, base acuminate, drawn out into a winged petiole of 1 inch. Stipules lanceolate, glandular-serrate, acuminate, 7–14 lines.

"Scapes or peduncles 1–3 on a stem, 9 lines long, with 2 narrow acute bracts and a reduced leaf, bearing 2 flowers on peduncles of nearly equal length, about 2 in., these bracteolate and often with a reduced leaf. Sepals lanceolate, faintly puberulent, 3 lines long. Petals about twice as long, white, broad, oblong to orbicular, the lower saccate, not bearded. Capsule a little over 5 lines long, glabrous."

Recorded only from the Koolau Range, Punaluu and Kahana sections, on the island of Oahu, at altitudes of 1,800–2,000 feet. Hygrophytic.

9. *Viola robusta* Hillebrand. Described in his Flora of the Hawaiian Islands, 1888, p. 16.

Stem 3–5 feet high, light-wooded, pale, about ½ in. thick at the base. It is simple or sparingly branched in the upper portion. The ascending branches are hollow, herbaceous at the extremities, and carry many old and dry flower-stalks. The stipules are long, persistent, dark, broadly lanceolate, long-pointed, denticulate, and about ½ in. long. Leaves membranous, puberulous underneath, ovate, acute, serrulate, 3–4½ in. long by 2–2½ in. broad; base truncate or cuneate; petiole 1–1½ in. long.

Flowers nodding, numerous; an inflorescence rises from nearly every axil. The flowers are generally single, or 2–4 irregularly disposed on a peduncle of very variable length. Pedicels 2 in. long, bi-bracteolate about the middle, the bracts long-subulate from a broad base, but often foliaceous. Sepals gibbous at the base, but not produced, narrow-lanceolate, 3–4 lines long. Petals twice as long, pale purple, oblong, the lowest saccate, the 4 upper ones converging, assurgent. Anthers shortly apiculate, the 2 lowest with a narrow dorsal wing along their whole length, which does not run out into a spur. Capsule 8–10 lines long, with 8–14 pale seeds on each placenta.

Recorded only from the summit bogs of East Molokai, in very wet situations, at altitudes of 2,500–4,000 feet. It grows in the swampy soil, and on the mossy trunks of trees. Native name

"*Pamakani*"; like several other species, it is used medicinally by the Hawaiians, who make a decoction of the foliage.

10. V. *robusta* var. *Mauiensis* Rock. Described in College of Hawaii Bulletin 1, 1911, p. 6.

Habit as for the species. Leaves with hirsute midribs. Blade oblong, ovate, subcordate, or truncate. Petioles hirsute, 1.5 2.5 cm. Stipules triangular from a broad base, acuminate, ciliate on the margins. Peduncles bibracteate, hirsute, 2–4 cm. long, one-flowered, (never two) in the axils of every leaf. Calyx hirsute, linear-lanceolate, acuminate. Petals pinkish. Capsule 1.5 cm. long. Seeds ovoid, blackish.

Recorded only from the middle slopes of Mount Hale-a-ka-la, island of Maui, at altitudes of 3,500–5,000 feet. In semi-xerophytic gulches. Native name "*Pamakani*"; used medicinally.

11. V. *robusta* var. *Wailenalenae* Rock. Described in College of Hawaii Bulletin 1, 1911, p. 6.

Stem 1–2 m. high, the branches as well as the stems hollow. Stipules light brown, broadly lanceolate, acuminate, about 3 cm. long, denticulate or serrate almost to the base. Leaves thick, fleshy, light green underneath, darker above; 9–10 cm. long by 3–4 cm. broad; ovate, acuminate at base and apex, serrulate with the base entire; midrib and petiole dark purple; petiole 4 cm. long. Flowers in the axils of the upper leaves; single or two on a short bi-bracteate peduncle. Pedicels 4–5 cm. long, bi-bracteolate above the middle. Flowers nodding; sepals gibbous at the base, 1 cm. long. Petals white, not fragrant; twice as long as the sepals; the lower saccate. Anthers apiculate, all winged. Style curved, thickening toward the stigma. Capsule hirsute when young.

Recorded only from the high, swampy plateau of Wai-ale-ale, island of Kauai, along Wai-lena-lena Stream, altitude 4,500 feet.

12. *Isodendrion pyrifolium* Gray. Described in the Botany of the United States Exploring Expedition, 1854, p. 93, pl. 8.

A spreading shrub, 2–3 feet long, the wand-like branches with short branchlets. The branchlets are foliose near the apex and covered for some distance below with narrow, lanceolate or subulate, silky-haired converging stipules, 1½–2 in. long. Leaves membranous, pubescent when young, ovato- or elliptico-oblong, obtuse, crenate, 1½–2 in. long by ¾–1 in. wide, on petioles of 3–5 lines.

Pedicels single, 2–4 lines long, pubescent, with a pair of rather broad scarious bractlets at the middle. Sepals connected at the base, 2½–3 lines, lanceolate, silky, scarious with thin margins. Petals 5–6 lines long, rather thick, greenish-white. Stamens nearly half the length of the sepals, the anthers as long as the filaments. Style almost straight, of even height with the petals. Capsule 6 lines long, each placenta with 2–5 obovoid pale seeds. The flowers are fragrant.

On all the islands, from Niihau to Hawaii, in the scrub vegetation on the semi-xerophytic foothills and exposed open ridges, at elevations of 1,000–3,000 feet. Native name "*Aupaka*."

13. *Isodendrion longifolium* Gray. Described as above, loc. cit., p. 95, pl. 9.

A glabrous shrub reaching a height of six feet or more, with rather stout branches and scattering leaves. Stipules erect, triangular or lanceolate, 1½–2 lines long. Leaves chartaceous, pale, shining, obovate-oblong, obtuse or shortly acuminate, gradually narrowing to the base, repandly crenate or subentire, 6–8 in. long by 2–2½ in. broad, on short petioles of ¼–1 in.

Flowers single, from short and thick bracteate spurs, the naked pedicels 1½ lines long. Sepals 2 lines long, glabrous. Petals twice as long, strap-shaped, scarcely dilated above, purplish-white. Stamens as for 12, the filaments curved. Capsule 3–5 lines long.

Confined to the island of Kauai, Wai-ale-ale, and the Waianae Range on Oahu, Ka-ala, at elevations of 2,000–3,000 feet.

14. *Isodendrion laurifolium* Gray. Described as above, loc. cit., p. 96.

A small glabrous shrub, the stipules subulate, brownish. Leaves oblong, acute, rounded at the base, repandly crenate or subentire, pale below, chartaceous, shining, 3½ in. long by 1 in. broad, on petioles of 1–2 lines.

Flowers single, bi-bracteolate, on pedicels of 1–2 lines, or the pedicels on bracteate spurs and naked. Other data not known.

Recorded only from the Koolau Range, island of Oahu, on exposed ridges of Wailupe Valley, a semi-xerophytic region. Little is known concerning this rare and highly localized species.

The following table will aid in roughly distinguishing the Hawaiian violets:

| Name | Stature, Feet | Color of Flowers | Fragrance |
|---|---|---|---|
| *V. Chamissoniana* | 3–5 | Pink, rose, purple | |
| *Helena* | 1–2 | White, pale lavender | |
| var. *Lanaiensis* | 1–4 | Pinkish-white | |
| *helioscopa* | 2–3 | Pure waxy white | Yes |
| *Kauiensis* | 1–3 | Pale blue | |
| *Mauiensis* | 1–2 | Dark blue | |
| var. *Kohalana* | 4–6 | White to dark blue | Yes |
| *Oahuensis* | $\frac{1}{2}$–1 | White | |
| *robusta* | 3–5 | Pale purple | |
| var. *Mauiensis* | 3–5 | Pinkish | |
| var. *Wailenalenae* | 3–6 | White | |
| *I. pyrifolium* | 2–3 | Greenish-white | Yes |
| *longifolium* | 6–8 | Purplish-white | |
| *laurifolium* | 2–3? | | |

College of Hawaii,
Honolulu

# A NEW HYBRID SUNFLOWER

By T. D. A. Cockerell

In 1895 Rydberg described a supposed species *Helianthus aridus*, which occurred in the region of *H. petiolaris* and *H. annuus lenticularis*, and appeared to be a possible hybrid between the two. Another form, known as *H. petiolaris* var. *patens* (Lehm.) Rydb., was also suspected of being a hybrid.* It was therefore particularly desirable to produce a genuine *petiolaris* × *annuus* hybrid, for comparison with these more or less intermediate forms. My wife made the crosses last year, and this year we have the resulting plants in large numbers. The *petiolaris*, used as the seed plant, was a specially fine but typical plant raised from seed collected by Mr. D. M. Andrews in Oklahoma. The *annuus* were various, including chestnut-red (*coronatus*) forms. The *H. petiolaris* was perfectly fertile with the *annuus* pollen, and the hybrids are all alike in general appearance.

*Helianthus annuus* × *petiolaris*, n. hybr.

Plants about four feet high, freely branching, the growth essentially like *petiolaris;* stems and branches hairy, more or less speckled with purple; leaves alternate, rarely opposite, the petioles about equal to the blades, or often shorter; leaf-blades with

* American Naturalist, XLIX (1915), pp. 611–613.

broad base (*annuus*-style), upper surface shiny (*petiolaris* character), the margins remotely and rather feebly dentate; smaller leaves narrower, practically entire; involucral bracts broad but tapering, the margin rather long-ciliate; disc small, 26–28 mm. diameter, dark with in some cases the white-haired center of *petiolaris* weakly indicated; rays long and ample, 34–42 mm. long, in one or two rows; achenes (immature) delicately hairy all over. When the pollen has come from a red *annuus*, the chestnut-red color appears in the hybrid, but always (on upper side) at base of rays, forming a very distinct ring or band occupying about the basal quarter of the rays. Thus the color-pattern is unlike that of *H. annuus*, and resembles rather that of *H. cucumerifolius*. On the under side of the rays the middle third shows more or less red, especially on the apical half; there is no relation between the patterns of the upper and under sides.

This hybrid is obviously not *aridus* or *patens*. If those plants are in any sense of hybrid origin, they are certainly not $F_1$ hybrids between *petiolaris* and *annuus*. On the other hand, the above hybrid should occur in nature, wherever the two species grow together. In the size of the flower-heads it is intermediate between the parents; in the general mode of growth and shiny leaves it is *petiolaris*, but the broad leaves with truncate base have the shape of *annuus*. The *petiolaris* color-pattern, not before known, is dominant over that of *annuus*. In all respects the plants are very like the *annuus* × *cucumerifolius* crosses previously made, and it is clear that *H. petiolaris* is a close relative of *cucumerifolius*. An important character not mentioned in current descriptions of *H. petiolaris* is the white center of the disc. This is due to the remarkable tufts of white hairs at the ends of the disc bracts, but only on those at and near the center. This character is wholly absent in all *H. annuus*. In the hybrid it is feebly indicated.

It is necessary to consider briefly the nomenclatural history of *H. petiolaris*. Nuttall described it in 1821 "from the sandy shores of the Arkansa; flowering in August." He notes that the leaves are "somewhat shining and almost destitute of serratures." The achenes are "covered with a silky and fulvous down." The flowers are about 3 or 4 inches in diameter, and the petioles and peduncles are of great length.

Twenty years later Nuttall described his *H. integrifolius*, said to closely resemble *petiolaris*, but with the lower leaves opposite and the peduncles relatively short. A variety *gracilis* had the leaves denticulate, scarcely 3-nerved, and the involucral bracts acuminate.*

In 1828 Lehmann described *Helianthus patens*, peculiar for the large heads (as compared with the common plant known as *petiolaris*), the long petioles and peduncles, and the peduncles fleshy toward the top. The leaves are shaped essentially as in *annuus*, or at any rate broader than in *petiolaris*. This, in its large heads and shape of leaf-blades, resembles our hybrid; but the latter has not especially long petioles, nor are the peduncles noticeably fleshy toward the top. In the long peduncles and petioles, and in the large heads, it resembles *H. petiolaris* as originally described. If *patens* can be separated at all from the original *petiolaris*, it must be by the broader leaves; Nuttall says of *petiolaris* and *integrifolius* both, that the leaves are "ovate or ovate-lanceolate." The original *petiolaris* appears to have been described from plants grown in Philadelphia from seed, and this may have affected its character.

It appears probable, however, that *H. integrifolius* is really the common plant of the Rocky Mountain foothills, which we know as *petiolaris*. The type of *petiolaris* may be essentially identical with *patens*, and thus we shall have to write *H. petiolaris integrifolius* (Nutt.) for the plant generally known as *petiolaris*. Suppose, however, that the original *petiolaris* and *patens* are of hybrid origin, though not $F_1$ hybrids of *annuus* × *petiolaris* Auctt., what will be the nomenclatural result?

*H. aridus* is not, I think, a hybrid; but rather a variety of *H. annuus lenticularis*.

*H. canus* (Britton) Wooton & Standley is a remarkable species which used to be considered a variety of *petiolaris*. I examined a specimen in U. S. Nat. Museum from near Casas Grandes, Chihuahua (*E. W. Nelson*). The small branches and stems are densely covered with white pubescence; involucral bracts with acuminate ends; disc white in middle as in *petiolaris*.

* Trans. Amer. Phil. Soc., N. S., **8**: 366. 1841.

There is much more to be said eventually about hybrid sunflowers, but some of them are very puzzling. We have a long series of plants grown from *H. annuus* pollinated by different perennial species, but showing *only annuus* characters. Other annual × perennial crosses have given quite different results, and at present we cannot pretend to understand the various results obtained. Experiments by Sutton in England have proved no less perplexing.*

The doubling of the rows of rays in annual sunflowers appears to be an old character. La Farge, in "One Hundred Masterpieces of Painting" (1912), reproduces a painting by Van Dyck (1599–1641), in which appears a very large sunflower, with two or three rows of rays.

## CONCERNING SOME SPECIES OF CARDUUS IN COLORADO

By Geo. E. Osterhout

A perplexing group of plants in Colorado is made up of the species of *Carduus*. There are quite a number of species and there are many forms which are intermediate, and do not conform to the descriptions of the recognized species. Dr. Rydberg accounted for many of these by recognizing them as hybrids, Bull. Torrey Club **37**. But it is not certain that all these forms are hybrids, and if some of them originated in that way, in time they may have become species, and should be so recognized.

*Carduus Osterhoutii* Rydb., Bull. Torrey Club **32**: 131.

One of the species of the high mountains accords more or less with the description of *Cirsium Hookerianum* Nutt. The type locality of this is much farther north, and Dr. Gray did not credit it to the Colorado mountains. In the Synopt. Flora N. A. he says: "Upper wooded and subalpine region of the Rocky Mountains, north of lat. 48°." There is reasonable doubt if this northern plant is found in the Colorado mountains, but Prof.

* Stand. Cyclop. Hort., **6**: 3281. 1917. The *H. annuus* × *cucumerifolius* hybrid was reported by A. Andrée in 1913, and again (from plants grown in Sweden) by Lundström in 1914. (Cf. Bot. Centralbl., 1915, No. 10, p. 242; 1916, No. 2, p. 31.) See also Journ. of Heredity, 1915, p. 545.

Nelson has accepted it in the New Manual of Rocky Mountain Botany, using Dr. Gray's description. Dr. Rydberg published it as *C. Osterhoutii*, Bull. Torrey Club **32**: 131; and afterward made it a hybrid of *C. griseus* × *scopulorum*, Bull. Torrey Club **37**: 548. It is true that there are forms which are intermediate between *C. scopulorum* Greene and this plant, but the plant which Dr. Rydberg described and *C. scopulorum* are as distinct as are *C. Hookerianus* Gray and *C. eriocephalus* Gray as described in the Synopt. Flora N. A.; and if *C. Osterhoutii* is distinct from *C. Hookerianus* I think it should be accepted as a species.

*Carduus araneosus* Osterhout, Bull. Torrey Club **32**: 612.

In the New Manual of Rocky Mountain Botany Prof. Nelson made this a synonym of *C. Hookerianus eriocephalus* (Gray) A. Nels., and in his list of hybrid thistles Dr. Rydberg classified it as *C. griseus* × *Parryi*, Bull. Torrey Club **37**: 549. *C. Hookerianus eriocephalus* (Gray) A. Nels., which I have been accustomed to label *C. scopulorum* Greene, is very leafy, the narrow leaves thickly beset with prickly teeth, the heads in a close cluster, the involucral bracts narrow and long, of nearly the same length, usually long wooly, and no glutinous spot. *C. araneosus* has broader leaves, the divisions not numerous and comparatively broad, tipped by a weak prickle, the bracts in successive lengths, with a glutinous spot, and arachnoid on the edges. There is scarcely any similarity between the two, and in the natural order they are not closely related. None of the characters which mark *C. Parryi* or *C. griseus* appear in *C. araneosus* to any marked degree; there are neither the "lacerate-fimbriate tips" of *C. Parryi* or the long flat bracts of *C. griseus*, and neither *C. Parryi* or *C. griseus* has a glutinous spot on the bracts. So far as I can see *C. araneosus* is as good a species as most of our Rocky Mountain thistles.

*Carduus laterifolius* Osterhout, Muhlenbergia **1**: 141.

This is another species which has a glutinous spot on the involucral bracts. The bracts are in successive lengths and tipped by a slender upright spine. In the typical forms the leaves are broad and little divided; but some other forms which I have placed with it, because they seem nearest to it, have narrower and more divided leaves. These two are medium-sized thistles, *C. araneosus* 5 to 7 dm. high, rather slender; *C. laterifolius* somewhat larger.

Where in an arrangement of the species of the genus do these two, with a glutinous spot on the involucral bracts, belong? They do not seem to belong with any of the species which have been so characterized in the manuals; not, at least, with the Undulati group, for the leaves are glabrate above. Possibly they might be arranged with the Altissimi, but they lack the general appearance of that group; they have not the form of the leaf or the shape of the head. They seem, rather, to belong to the Carlinoides group, having a resemblance to *C. Americanus*. If they are hybrids one of the parent forms would seem to be *C. Americanus*, and the other some species with a glutinous spot on the involucral bracts. In *C. araneosus* we would have to account for the arachnoid involucre, and in *C. laterifolius* for the broad leaf in the typical forms; in either case the parent form does not seem to be available. Besides there seem to be hybrid forms of *C. Americanus* and *C. laterifolius*, plants with broad leaves, a glutinous spot on the involucral bracts, and fimbriate bracts. Considering their general characteristics it would seem that they belong with the *Carlinoides* group, near to *C. Americanus*.

With the *Carlinoides* group also belong *C. spathulatus* Osterhout, and *C. modestus* Osterhout. *C. aciculatus* Osterhout belongs with the Undulati, having a resemblance to the species of that group. It has narrow involucral bracts, slender spreading spines, and leaves tomentose on both sides. It is about as near *C. undulatus* Nutt. as any of our Colorado species.

WINDSOR, COLORADO

## SOME ABNORMAL POPLAR FLOWERS

BY GEORGE T. HASTINGS

In April, 1916, a peculiar tree of the aspen—*Populus grandidentata*—was found beside a new road on the talus slope of the Palisades about opposite 220th Street, New York. The tree at the time was covered with slender green catkins of pistillate flowers. On several branches there were larger, gray catkins—apparently staminate—so different from the others as to be noticeable at a considerable distance. These catkins proved to

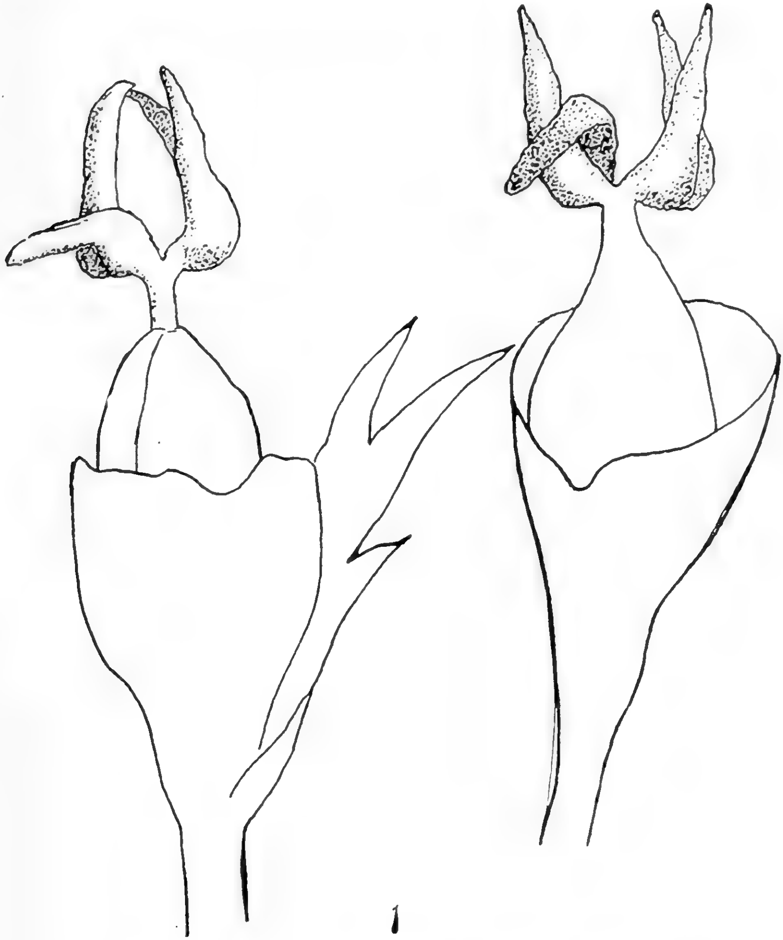
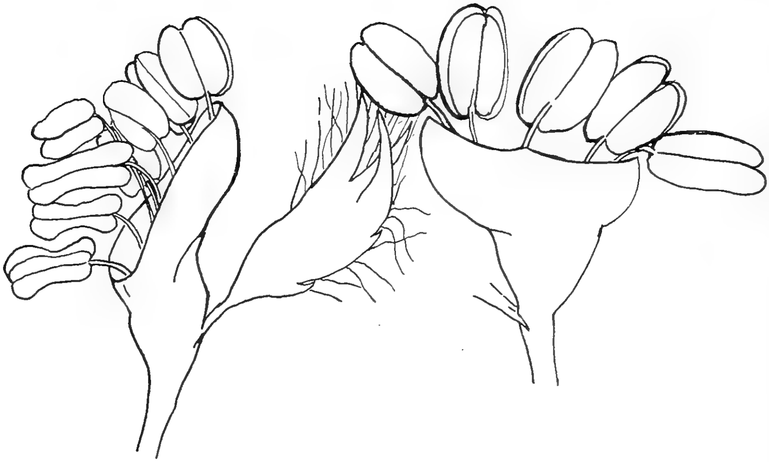


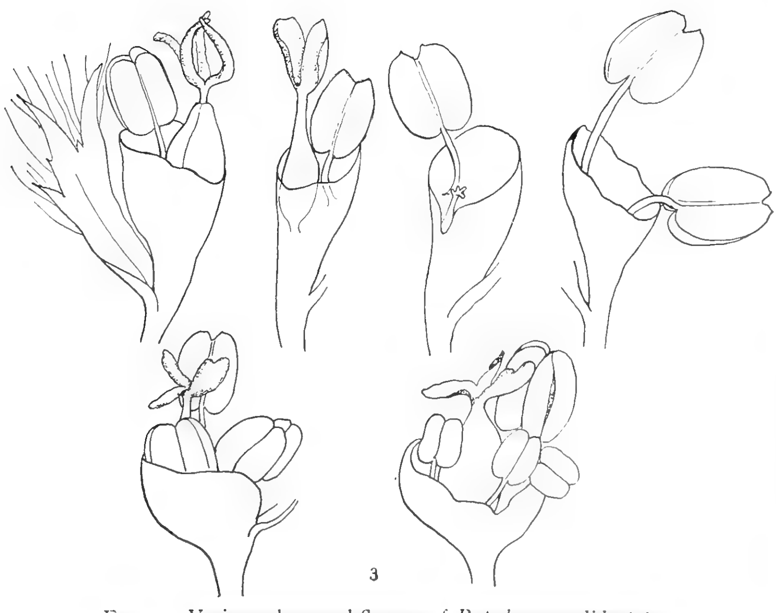
FIG. 1. Normal pistillate flower of *Populus grandidentata*.

be made up of staminate, pistillate, and perfect flowers arranged without any regular order. On some of the catkins staminate flowers predominated, on others pistillate—but most of them were made up almost entirely of perfect flowers. The tree was visited



2

FIG. 2. Normal staminate flowers of *Populus grandidentata*.



3

FIG. 3. Various abnormal flowers of *Populus grandidentata*.

again in the latter part of April, 1917, and the same characters observed. On most branches the flowers were ordinary pistillate ones, like those on other trees in the neighborhood. They had a receptacle in the form of an oblique cup closely surrounding the basal one half or two thirds of the ovary, the two stigmas were

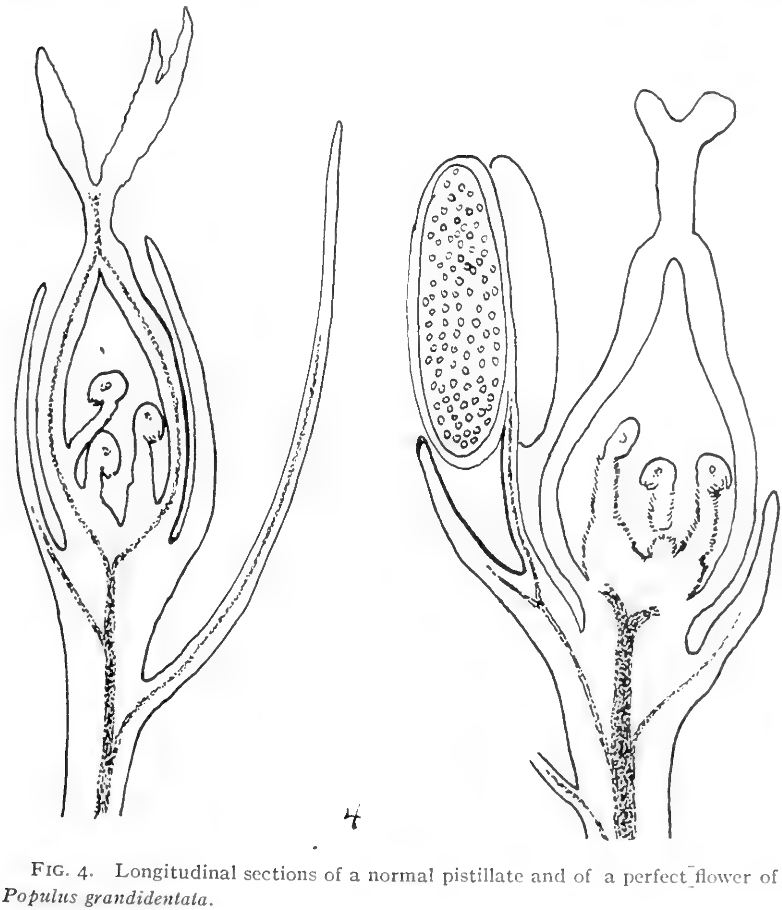


FIG. 4. Longitudinal sections of a normal pistillate and of a perfect flower of *Populus grandidentata*.

so deeply cleft as to give the appearance of four stigmas. On nearby staminate trees the flowers were normal—a shallow, oblique cup or disk with ten or twelve stamens, except near the tip of the catkins where the number of stamens was reduced to three or four. On the tree in question the abnormal catkins were on several branches on the south and west sides of the tree—the sides of best development—though even on these branches some twigs bore normal catkins. The abnormal catkins consisted chiefly of flowers with the deep cup-shaped receptacles of pistillate flowers with one pistil and one or two stamens, both pistil and stamens being functional. A few had perfect stamens but an aborted pistil, some a very small but apparently functional pistil. Near the tip of the catkins the flowers were very irregular with from four to six stamens, some with, some without a pistil. Scattered along the axis were ordinary pistillate flowers. Other catkins were predominately staminate. In these most of the flowers had the cup-shaped receptacles characteristic of pistillate flowers, but each with a number of stamens (4–6), and no pistil. Near the tip there was even greater irregularity than in the others. Around a terminal perfect flower were some staminate flowers with ten or more stamens and some stamens growing in the axils of smooth-edged scales. The figures show a few of the normal flowers, as well as several of the abnormal ones. The normal flowers were drawn from flowers of neighboring trees. Longitudinal sections of a normal pistillate flower and of one of the perfect ones are also shown. In the normal flower there was no trace of rudimentary stamens nor of bundle traces that might indicate their position. There is nothing to indicate that these perfect flowers show reversion to ancestral conditions, the explanation must be rather in some irregularity in the division of chromosomes. The tree had been struck by rolling stones and patches of bark knocked off, but the injury was no greater than on dozens of normal trees in the immediate vicinity.

YONKERS

## NEWS ITEMS

At the annual meeting of the club held at the American Museum of Natural History on January 8, all the officers were re-elected for 1918. President Richards announces the same committees for 1918 as before with the addition of Mr. George T. Hastings to the Field Committee.

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# OTHER PUBLICATIONS

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## (1) BULLETIN

A monthly journal devoted to general botany, established 1870. Vol. 44 published in 1917, contained 579 pages of text and 26 full-page plates. Price $4.00 per annum. For Europe, 18 shillings. Dulau & Co., 47 Soho Square, London, are agents for England.

Of former volumes, only 24–44 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–44 three dollars each.

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## (2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–15 are now completed; No. 1 of Vol. 16 has been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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BY

NORMAN TAYLOR

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Brooklyn Botanic Garden

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# TORREYA

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## ADDITIONS TO THE FLORA OF WESTERN OREGON

By J. C. Nelson



The conditions of plant growth are so favorable in that part of Oregon lying west of the Cascade Mountains, and the establishment of introduced species is so easy, that it is becoming a serious task to keep pace with the increase. Not only are plants properly belonging to the Californian flora which prevails south of the Calapooias constantly extending their range to the northward, together with a steady immigration of inland species down the valley of the Columbia, but there is a constant influx of European immigrants which become self-sown and locally established very rapidly. It is therefore a matter of some regret to the local collectors who so warmly welcomed the latest manual covering this region (Piper and Beattie's Flora of the Northwest Coast) that its authors did not take more positive ground in regard to the inclusion of these immigrants. Their problem is one which confronts every botanist who undertakes to catalogue the flora of any considerable extent of territory. Two opposite points of view are possible. Either all introduced plants may be excluded, or all may be included. In the latter case, the list will be needlessly swelled by waifs and ballast-plants that will not persist, and are in no sense real members of the local flora; in the former, by leaving out all plants of foreign origin, some of the most abundant and characteristic species may be omitted and the value of the book to the local student seriously impaired. To the layman, the most easily intelligible purpose of any descriptive flora is to render it possible for any student to identify by its aid any plant which he may find growing spontaneously within its geo-

[No. 1, Vol. 18 of Torreya, comprising pp. 1–20, was issued 13 February 1918.]

graphical limits. That this aim is very rarely attained renders it none the less the chief *raison d'être* of every botanical manual. There is a practical problem involved here, as every author comes to realize. No publisher is likely to undertake the production of a work of this kind, unless he can be assured that it will sell. His chief customers will necessarily be the schools and colleges of the district covered. If it becomes evident that the book does not adequately serve the purpose above indicated, its chances of securing the indorsement of these institutions will not be very great. Our pupils in the secondary schools are not interested in taxonomic discussions; they want to be able to name the plants which they encounter in their excursions; and the commonest of these, at least here in Western Oregon, are just as likely to be introduced as indigenous. These foreign species can of course be relegated to an appendix, as has been done by Coulter and Rose in their Monograph of the North American Umbelliferae; but if they are included at all, it is much more convenient for the student to insert them in the body of the work.

The authors of the Flora of the Northwest Coast were of course at liberty to omit *all* introduced species; but since it is plain that they have included *some*, we are left to conjecture on what grounds others were excluded. For example, I have never seen but one specimen of *Ulex europaeus* growing wild about Salem; yet this species is included, while the related *Cytisus scoparius*, which sets our hills and roadsides ablaze in early spring, and is fast becoming a formidable menace to the farmer, finds no mention. Why should *Stellaria media* be included, and *Bellis perennis* be omitted, when the two are found everywhere growing together, and the latter is so abundant as to be in nine cases out of ten the first plant in flower encountered by the student? *Foeniculum vulgare* is a far more abundant and characteristic plant about Salem than *Hesperis matronalis;* yet the latter finds a place while the former does not appear. *Silybum marianum* and *Camelina microcarpa* I have never seen in Oregon except as ballast-plants, while *Melissa officinalis* and *Tanacetum vulgare* are everywhere common. The list could be indefinitely extended. When the most abundant and familiar of our local species find no place in a work of this kind, one is forced to conclude that its value is never going to be fully appreciated by beginners.

In the case of the indigenous species, it is to be regretted that the authors have selected as their southern boundary a barrier so easily crossed as the Calapooia Range. Experience shows that the species which have been regarded as distinctively Californian are pressing steadily northward, and in many cases have been reported far within the limits of this manual. No hard and fast geographical line of this sort can ever be drawn, and the attempt to do so only confuses and misleads the beginner. In the same way, species that have been considered as belonging to the flora of the interior are continually being transported down the Columbia, and even travelling over the lower summits of the Cascades. To say that these species are only recent introductions, and do not belong ecologically to this district, is only to beg the question. How can we show that they have not been here as long as the species which are more characteristic? The desert plants growing on the gravelly prairies about Salem are just as integral a part of the local flora as any typical west-coast forms.

The fact remains that the number of trained observers here in Oregon is all too few to keep pace with the exuberant invasion of foreign species. A few notes based on my own collections during the past three seasons may serve to show that we cannot accept the Flora of the Northwest Coast as final—which its distinguished authors would be the last to claim.

The following list is not intended to be exhaustive. I am sure that other collectors in this field, notably Mr. M. W. Gorman, of Portland, and Professor M. E. Peck, of Willamette University, will be able to add many names to this enumeration. It is simply a record of plants that I have myself collected, and that have in most cases been submitted to Professor Piper himself for identification. In the case of the grasses I am under obligation to Mrs. Agnes Chase, of the Bureau of Plant Industry at Washington, D. C., for her kindness in determining my specimens. Mr. Kenneth K. Mackenzie, of New York City, has been good enough to verify the sedges. Some of the rarer introduced plants have been very kindly verified by the staff of the Gray Herbarium. It will be understood that all species included in the following list have been collected within the Oregon limits of the Flora of the Northwest Coast, and that none of them are mentioned in its pages. The length of the list will serve to show how much field work remains to be done in this state before any manual of its flora can be regarded as complete.

1. *Typha angustifolia* L. Common along the mill-race at Eugene, and also observed in the old bed of Lake Labish, two miles east of Brooks, Marion Co.
2. *Syntherisma Ischaemum* (Schreb.) Nash. On sandy shores of the Willamette River at Salem, and also on lawns about the city.
3. *Panicum miliaceum* L. On rubbish-heaps about Salem.
4. *Anthoxanthum Puelii* Lecoq & Lamotte. In dry ditches by the roadside, Turner, Marion Co., and in similar situations near Fairfield in the same county.
5. *Aristida oligantha* Michx. Common along the sandy shores of the Willamette near Salem.
6. *Stipa occidentalis* Thurb. Dry rocky soil near Government Camp, Mt. Hood.
7. *Muhlenbergia filiformis* Rydb. In mud of dried-up ponds near Government Camp, Mt. Hood.
8. *Sporobolus cryptandrus* (Torr.) Gray. Muddy shore of the Columbia on Hayden Island, opposite Vancouver, Wash.
9. *Agrostis hiemalis* (Walt.) BSP., var. *geminata* Hitchc. Wet sandy streets, Newport.
10. *Avena fatua* L. Common along railroad tracks about Salem.
11. *Phragmites communis* Trin. In low ground, Lake Labish; also along the Columbia near Knappa and Blind Slough, Clatsop Co.
12. *Melica Geyeri* Munro. Roadsides about Salem.
13. *Briza minor* L. Abundant under trees in State Fair Ground, Salem.
14. *Poa scabrella* Benth. On gravelly prairies about Salem; also on rocks at Silver Creek Falls, Marion Co.

15. *Festuca rubra* L., var. *megastachys* Gaud. Along railroad tracks and roadsides about Salem.
16. *Festuca idahoensis* Elmer. In dry pastures at Salem and Eugene.
17. *Scleropoa rigida* Griseb. Around buildings in business district, Salem.
18. *Bromus carinatus* Hook. & Arn. Very common in waste places everywhere. Much of what passes as *B. marginatus* Nees should be referred to this species.
19. *Bromus hordeaceus* L., var. *glabrescens* Shear. With the species, and almost equally common.
20. *Bromus tectorum* L. Along the railroad, Salem.
21. *Lolium perenne* L., var. *cristatum* Doell. Border of woods near Eola, Polk Co.
22. *Agropyron caesium* Presl. Dry soil about the lighthouse on Yaquina Head, Lincoln Co.
23. *Triticum vulgare* L. A common escape in railroad yards.
24. *Sitanion jubatum* Sm. Dry soil on Skinner's Butte, Eugene.
25. *Cyperus acuminatus* Torr. & Hook. Alkaline soil by the roadside, near Turner; also in wet ground at Salem.
26. *Cyperus esculentus* L. Common on the sandy shore of the Willamette at Salem.
27. *Eleocharis ovata* R. & S. In ditches along railroad, Walton, Lane Co.
28. *Carex Hallii* Bailey. On rocks in mountain streams at Gates, Marion Co. and Hendricks, Lane Co.; also in the Willamette at Salem.
29. *Carex leptopoda* Mackenzie ined. In low thickets along the McKenzie River at Dedman's Ferry, near Eugene.
30. *Carex subfusca* W. Boott. Dry pasture on mountain-side near Coburg, Lane Co.
31. *Carex interior* Bailey. In low ground in Lake Labish.
32. *Carex specifica* Bailey, var. *brevifructus* Kükenthal. Swampy ground along Silver Creek, near Silverton.
33. *Carex abrupta* Bailey. In a swamp near Government Camp, Mt. Hood.
34. *Carex tumulicola* Mackenzie. Not uncommon in dry ground about Salem.

35. *Carex prairea* Dewey. Boggy meadow near Chemawa, Marion Co.

36. *Scirpus paludosus* A. Nels. In salt-marshes, Seaside, Clatsop Co.

37. *Juncus patens* Mey. Not uncommon in low ground about Salem.

38. *Juncus uncialis* Greene. In low meadows in Lake Labish, near Chemawa.

39. *Humulus Lupulus* L. Our commonest field crop, and a frequent escape to roadsides and thickets throughout the Willamette Valley.

40. *Cannabis sativa* L. On refuse-heaps about Salem.

41. *Chenopodium ambrosioides* L. On sand-bars along the Willamette at Salem.

42. *Chenopodium Botrys* L. Becoming abundant along the Willamette near Salem.

43. *Chenopodium glaucum* L. On sandy shore of the Columbia opposite Vancouver, Wash.

44. *Corispermum hyssopifolium* L. With the last.

45. *Sedum acre* L. Well established on waste ground, Salem.

46. *Agrostemma Githago* L. In grain-fields, Marion and Polk Cos., and on the border of a thicket at Salem.

47. *Silene dichotoma* Ehrh. On gravelly shore of North Santiam River, Detroit, Marion Co.

48. *Silene campanulata* Wats., var. *Greenei* Wats. Rocky summit of Spencer's Butte, near Eugene.

49. *Saponaria officinalis* L. Abundant in sandy soil along the Willamette from Eugene to Salem.

50. *Saponaria Vaccaria* L. In railroad yards, Portland.

51. *Sagina procumbens* L. Rocky border of garden at Elk Rock, Multnomah County.

52. *Cerastium nutans* Raf. In thickets, Falls City, Polk Co.

53. *Arenaria Douglasii* Fenzl. Rocky woods on Spencer's Butte, Eugene.

54. *Ranunculus arvensis* L. In wet meadow near Chemawa, Marion Co.

55. *Ranunculus bulbosus* L. In vacant yard, Salem.

56. *Delphinium Ajacis* L. Abundant on waste ground at Salem.
57. *Papaver Rhoeas* L. In old gardens and waste ground, Salem.
58. *Fumaria officinalis* L. In cultivated ground, Salem.
59. *Corydalis lutea* DC. Rocky border of garden at Elk Rock, Multnomah Co.
60. *Iberis coronaria* Don. Dry soil on Skinner's Butte, Eugene.
61. *Lunaria annua* L. Alluvial soil along Mill Creek, Salem.
62. *Lepidium apetalum* Willd. Waste ground and street parking, Portland, Eugene, and Salem.*
63. *Lepidium perfoliatum* L. Becoming common in waste places about Portland and Salem.
64. *Lepidium campestre* (L.) R. Br. On street-parking, Eugene.
65. *Crambe maritima* L. Sandy beach at base of cliff on Yaquina Head.
66. *Brassica alba* (L.) Boiss. Alluvial bank of stream, Salem.
67. *Sisymbrium Sophia* L. In railroad-yards, Portland.
68. *Lobularia maritima* (L.) Desv. On sandy sea-beach, Newport.
69. *Saxifraga Sibthorpii* Boiss. On wet cliffs at Elk Rock.
70. *Therofon majus* (Gray) Wheelock. Rocky shore of North Santiam River at Gates, Marion Co., and along Silver Creek at Silverton.
71. *Pyrus communis* L. Thoroughly established along a stream near Champoeg, Marion Co.
72. *Horkelia congesta* Hook. Abundant on gravelly prairies about Salem.
73. *Horkelia hirsuta* Lindl. In open woods, Falls City.
74. *Cytisus scoparius* (L.) Link. Abundant on hillsides everywhere in Marion Co.
75. *Lupinus oreganus* Heller. Common in open ground about Salem.
76. *Melilotus indica* (L.) All. Waste ground on river-bank, Salem.
77. *Lotus Torreyi* Greene. Among rocks along the McKenzie River, Hendricks, Lane Co.
78. *Trifolium incarnatum* L. In open woods, Mill City, Marion Co.

* This may possibly be *L. medium* Greene, but the forms are not typical.

79. *Robinia Pseudo-Acacia* L. Escaped from cultivation near Jefferson, Marion Co.

80. *Vicia villosa* Roth. Becoming abundant along fence-rows and railroad embankments about Salem.

81. *Vicia Faba* L. In State Fair Ground, Salem.

82. *Vicia dasycarpa* Tenore. Waste ground, Portland.

83. *Lathyrus latifolius* L. Very common on vacant lots about Salem.

84. *Lathyrus Aphaca* L. Not uncommon in waste ground at Salem.

85. *Linum usitatissimum* L. In railroad-yards and waste places, Salem.

86. *Euphorbia dictyosperma* Fisch. & Mey. Rocky roadside, East Independence, Marion Co.

87. *Euphorbia Lathyrus* L. In an old field, Tualatin; also around gardens at Salem.

88. *Vitis vinifera* L. Thoroughly established in thickets along the river at Salem.

89. *Malva sylvestris* L. In vacant lots and waste places, Salem.

90. *Sidalcea* sp. An apparently undescribed species is not uncommon in dry open places about Salem.*

91. *Boisduvalia glabella* Walp. In swales, Springfield; and in State Fair Ground, Salem.

92. *Onagra strigosa* Rydb. On a sand-bar in the Columbia River at Hayden Island, opposite Vancouver, Wash.

93. *Anogra pallida* (Lindl.) Britt. With the last.

94. *Conium maculatum* L. Very common along streets at Eugene; also on waste ground at Silverton and Portland.

95. *Foeniculum vulgare* Hill. Abundant on vacant lots at Salem.

96. *Lomatium macrocarpum* Coult. & Rose. On gravelly prairies about Salem.

97. *Anethum graveolens* L. In cultivated ground at Salem.

98. *Vinca major* L. Common on roadsides and river-banks about Salem.

99. *Asclepias speciosa* Torr. In dry pastures at Eugene, and in meadows at Gerlinger, Polk Co.

* Prof. Piper regards this as undescribed; but Mr. J. F. Macbride is inclined to refer it to *S. spicata* Greene, a Californian species that has been reported from southern Oregon.

100. *Asclepias mexicana* Cav. On Skinner's Butte, Eugene; and in gravelly prairies and along the railroad near Salem.

101. *Gilia aggregata* Spreng. Rocky summit of Bald Mountain, near Detroit, Marion Co.

102. *Borago officinalis* L. Established on street-parking, Eugene.

103. *Cynoglossum officinale* L. Abundant on vacant lots at Mill City.

104. *Myosotis lutea* (Cav.) Pers., var. *versicolor* (Pers.) Thellung. Becoming common everywhere in fields and on roadsides in the Willamette Valley.

105. *Verbena officinalis* L. About old buildings at St. Paul, Marion Co.

106. *Thymus Serpyllum* L. Escaped from cultivation to roadsides at Jefferson and Salem.

107. *Lamium purpureum* L. Well established under trees on campus of Willamette University, Salem.

108. *Melissa officinalis* L. Common about towns throughout the Willamette Valley.

109. *Lycopus rubellus* Moench. In low ground along the Willamette, Salem.

110. *Mentha Pulegium* L. Common in pastures and on roadsides along the valley of the Mohawk River, above Hendricks.

111. *Mentha rotundifolia* (L.) Huds. On border of thicket near Springfield; and along roadside at Salem.

112. *Mentha Piperita* L. Common in wet places throughout the Willamette Valley.

113. *Physalis pruinosa* L. On gravelly shore of the Willamette at Salem.*

114. *Solanum Dulcamara* L. Very common in thickets in old bed of Lake Labish, appearing as if indigenous; also along Mill Creek at Salem, and in river-thickets at Independence.

115. *Solanum triflorum* Nutt. On sandy shore of the Columbia opposite Vancouver, Wash.

116. *Solanum nigrum* L., var. *villosum* L. On sandy shores of the Willamette at Salem; also on sandy roadsides along the Columbia near Portland.

* What seems to be *P. subglabrata* Mackenzie & Bush has also been collected along the railroad at Salem.

117. *Datura Tatula* L. Growing with *D. Stramonium* L. in sandy river-bottoms near Salem.
118. *Nicotiana attenuata* Torr. In sandy soil about Portland.
119. *Verbascum speciosum* Schrad. Well established in grounds of Lewis & Clark Exposition, Portland.
120. *Linaria Cymbalaria* (L.) Mill. Around old buildings on river-bank, Salem.
121. *Antirrhinum majus* L. On railroad embankments near Salem.
122. *Limosella aquatica* L. On muddy shore of the Columbia opposite Vancouver, Wash.
123. *Veronica Tournefortii* Gmel. Common in cultivated ground, Salem and Oregon City.
124. *Plantago major* L., var. *asiatica* (L.) Dcne. On sandy sea-beach, Newport.
125. *Asperula odorata* L. A frequent escape about Salem and Portland.
126. *Galium verum* L. On street-parking, Salem.
127. *Galium sylvaticum* L. Escaped from cultivation about Salem.
128. *Galium parisiense* L. Dry road-side at base of Skinner's Butte, near Eugene; and on street-parking, Salem.
129. *Galium tricorne* Stokes. Climbing on bushes in a thicket near Eugene.
130. *Valerianella olitoria* Poll. On lawns and stone fences about Salem.
131. *Campanula Medium* L. A frequent escape about Salem.
132. *Campanula rapunculoides* L. On waste ground, Salem.
133. *Solidago caurina* Piper. Dry soil about Government Camp, Mt. Hood.*
134. *Bellis perennis* L. Abundant on lawns, and often in pastures about Salem.
135. *Erigeron corymbosus* Nutt. On gravelly prairies, Salem.
136. *Ambrosia artemisiifolia* L. Dry roadside near Salem.
137. *Xanthium spinosum* L. On waste ground, Salem.
138. *Helianthus annuus* L. A common escape on river-banks and in waste places, Salem and Eugene.

* A *Solidago* resembling *S. rugosa* Mill., evidently an escape, was found in a plowed field near Salem.

139. *Bidens frondosa* L. Very common in low ground throughout the Willamette Valley.
140. *Coreopsis tinctoria* Nutt. In waste places, Salem.
141. *Lasthenia glaberrima* DC. Dry ditches along railroad near Salem; also near Jefferson, Marion Co.
142. *Chrysanthemum Parthenium* L. On river-banks at Salem; abundant along the railroad at Bridal Veil, Multnomah Co.
143. *Chrysanthemum Balsamita* L., var. *tanacetoides* Boiss. Well established along the railroad near Salem.
144. *Tanacetum vulgare* L. Common on road-sides and river-banks throughout the Willamette Valley.
145. *Artemisia Lindleyana* Bess. On sandy shore of the Columbia opposite Vancouver, Wash.
146. *Artemisia dracunculoides* Pursh. With the last.
147. *Artemisia Douglasiana* Bess. Common in river-bottoms along the Willamette.
148. *Artemisia biennis* Willd. In railroad yards, Portland.
149. *Senecio Cineraria* DC. Escaped to waste ground, Salem.
150. *Senecio Jacobaea* L. In railroad yards, Portland.
151. *Cirsium arvense* (L.) Scop., var. *mite* Wimm. & Grab. With the last.
152. *Cnicus benedictus* L. Borders of fields and on roadsides, south of Salem.
153. *Lactuca Scariola* L. Common in fields and waste places about Eugene and Salem, associated with the var. *integrata* Gren. & Godr.

The species that occur only as ballast-plants (about 75 in number) are not included in the above list, since an enumeration of these has appeared in a recent number of this journal.*

Of the 153 species listed above, 92, or 60 per cent. of the total, are undoubtedly introduced; the remaining 40 per cent. seem to be indigenous, though in the case of several this cannot be affirmed with certainty. The total number of species and named varieties mentioned in the Flora of the Northwest Coast is 1617. It does not seem unreasonable to assume that this number can be brought up to two thousand after a more thorough survey of the field.

The following extensions of range beyond the limits assigned

* September, 1917.

by Piper and Beattie may also be of interest, as showing the rapidity with which many species are spreading. It will be understood that, as in the first list, all my specimens have been collected in Oregon. The range assigned by the authors is given first in each case.

1. *Ceropteris triangularis* (Kaulf.) Underw. "Crevices of rocks, mostly near the sea-coast . . . more common on the Oregon coast." On rocky hillsides near Turner, in the Willamette Valley.
2. *Equisetum littorale* Kühlewein. "Shawnigan Lake, Vancouver Island, *Macoun*." "Agassiz, B. C., *Macoun*." Abundant in marshy ground in Lake Labish.
3. *Phalaris minor* Retz. "On ballast, Nanaimo, Vancouver Island, *Macoun*." On ballast at Linnton.
4. *Gastridium lendigerum* (L.) Gaud. "Umpqua Valley and southward, introduced. Perhaps not in our limits." Common about Eugene.
5. *Festuca aristulata* (Torr.) Shear. "Upper Willamette Valley to California." About Eola, Polk Co., in the central valley.
6. *Festuca rubra* L. "Mostly along the sea-shore." Not uncommon on gravelly prairies about Salem, appearing as if indigenous, and common on lawns, where it is plainly introduced.
7. *Poa multnomae* Piper. "On rock cliffs along the Columbia." On rocks in the gorge of Silver Creek, above Silverton, Marion Co.
8. *Hordeum jubatum* L. "In salt marshes." Common on gravelly prairies about Salem.
9. *Carex verecunda* Holm. "Known only from Mount Hood, Oregon." On grassy shaded roadsides in the hilly country fifteen miles east of Salem.
10. *Carex athrostachya* Olney. "Rare in our limits but common east of the Cascade Mountains. Reported from Victoria, British Columbia, *Macoun*." Common along the muddy shore of the Willamette at Salem.
11. *Carex Hindsii* Clarke. "Along the ocean coast, Vancouver

Island to Oregon." In overflowed meadows on Hayden Island, opposite Vancouver, Washington.

12. *Scirpus validus* Vahl. "Rare in our limits, reported from Vancouver Island, *Macoun*." In swampy ground near St. Paul, Marion Co.

13. *Juncus Bolanderi* Engelm. "Vancouver Island to northern California, near the coast." About Springfield in the Willamette Valley.

14. *Disporum Smithii* (Hook.) Piper. "Along the coast, Nootka Sound . . . to northern California." In woods at Silver Creek Falls, in the western foothills of the Cascades.

15. *Sisyrinchium birameum* Piper. "Vancouver, Washington, *Piper*." In low ground near Chemawa, Marion County.

16. *Eriogonum nudum* Dougl. "Upper Willamette Valley and southward." On gravelly prairies about Salem.

17. *Polygonum bistortoides* Pursh. "Moist meadows in the mountains at 1,500 to 2,000 m. altitude." In low ground about Salem at less than 70 m.

18. *Amaranthus graecizans* L. "Departure Bay, Vancouver Island, *Macoun*." In waste ground about Eugene.

19. *Amaranthus blitoides* Wats. "Departure Bay, Vancouver Island, British Columbia, *Macoun*." On the shore of the Columbia at Hayden Island.

20. *Mollugo verticillata* L. "On river-banks, probably in our limits." Common on the sandy shore of the Willamette at Salem.

21. *Spergula sativa* Boenn. "Victoria, Macoun." In cultivated ground and waste places at Salem.

22. *Clematis ligusticifolia* Nutt. "Reported from the Willamette Valley, but not verified." Abundant in thickets along the Willamette from Eugene northward.

23. *Caltha asarifolia* DC. "In bogs, along the coast, Alaska to Oregon." In the old bed of Lake Labish, in the Willamette Valley near Salem.

24. *Cakile edentula* (Bigel.) Hook. "Very rare along the seacoast." One of the commonest beach plants about Seaside and Newport.

25. *Radicula obtusa* (Nutt.) Greene. "Reported from Vancouver Island, British Columbia, *Macoun*." Abundant on mud-flats, Oswego Lake, Clackamas Co.; and on the shore of the Columbia at Hayden Island.
26. *Lepidium Draba* L. "Sparingly introduced from Europe; Victoria, B. C., *Anderson*." On ballast at Linnton.
27. *Mitella ovalis* Greene. "In moist ground near the coast, Vancouver Island to California." In woods at Silver Creek Falls, with No. 14.
28. *Sanguisorba microcephala* Presl. "In bogs near the ocean coast, Alaska to northern California." In a swamp near Government Camp, Mt. Hood, at 4,000 feet elevation.
29. *Geum strictum* Ait. "Victoria, British Columbia, *Macoun*. Not elsewhere reported from west of Cascade Mountains." Along wooded roadsides at Elk Rock, near Portland.
30. *Trifolium microdon* Hook. & Arn. "Sandy soil, near the seacoast." Open ground at Falls City, on the eastern slope of the Coast Range.
31. *Osmorhiza ambigua* (Gray) Coult. & Rose. "In the mountains at about 1,500 m. altitude, rare." Not uncommon about Salem at less than 70 m.*
32. *Ledum columbianum* Piper. "In sphagnum bogs, near the mouth of the Columbia River." On sand-dunes at Newport; and in a bog in the old bed of Lake Labish.
33. *Lysimachia Nummularia* L. "Portland, Oregon, *Gorman*." In low thickets along the Willamette at Salem.
34. *Nemophila atomaria* Fisch. & Mey. "Douglas Co., Oregon and southward." Very common in Marion Co. between Marion and Jefferson.
35. *Mertensia denticulata* (Lehm.) Piper. "In woods near the ocean coast in Washington." In low woods along the Willamette at Salem. Macbride's recent revision of this genus clearly shows that this species should be called *M. platyphylla* Heller.
36. *Scutellaria galericulata* L. "Rare in our limits; Mt. Constitution, *Henderson*." In low ground in Lake Labish.

*So determined by Piper; but Macbride regards it as *O. occidentalis* (Nutt.) Torr., which is not included in the Flora of the Northwest Coast.

37. *Scutellaria angustifolia* Pursh. "Rare in our limits; Victoria, *Macoun*." On summit of Spencer's Butte, near Eugene.
38. *Stachys palustris* L. "In wet places, rare in our limits: Vancouver, Washington, *Suksdorf*." In low ground about Eugene and Salem.
39. *Stachys pubens* (Gray) Heller. "In swampy places near the ocean coast." Not uncommon about Eugene.
40. *Castilleja levisecta* Greenm. "In open meadows near the seacoast, Vancouver Island and Washington." In a wet meadow south of Salem.
41. *Heterocodon rariflorum* Nutt. "Said to occur in the Willamette Valley." Found in Lake Labish, and also along the railroad south of Salem.
42. *Campanula prenanthoides* Durand. "In open places, southern Oregon, perhaps not reaching our limits." In rocky woods on Spencer's Butte, near Eugene.
43. *Xanthium varians* Greene. "Sandy banks of the Columbia River." Common along the shores of the Willamette as far south as Independence.
44. *Chrysopsis villosa* (Pursh) Nutt. "Rare west of the Cascade Mountains; Coupeville, Washington, *Gardner*." On gravelly shores of the Willamette from Independence to Salem.
45. *Senecio sylvaticus* L. "Introduced from Europe; Portland, Oregon, *Gorman*." Common in the Coast Range west of Eugene, and abundant along the coast from Newport to the mouth of the Columbia.

In the case of many other species the notation "rare" or "infrequent" is inaccurate as far as the region about Salem is concerned.

# AN UNDESCRIBED SCIRPUS FROM CALIFORNIA

By N. L. Britton

**Scirpus Congdoni** sp. nov.

Perennial by short stout rootstocks. Culms slender, erect, smooth, somewhat trigonous, 4–5 dm. high, leaf-bearing below the middle. Leaves linear, smooth, acuminate, 5–6 mm. wide, the lower ones 1.5–2 dm. long, the upper shorter; involucral leaf similar to the others, 3–7 cm. long; umbel more or less compound, its principal rays 3–6, very slender, 8 cm. long or less; spikelets sessile, capitate at the ends of the rays and raylets, several-flowered, the heads 7–10 mm. in diameter; scales brown, ovate to ovate-lanceolate, rather abruptly acuminate; style 3-cleft; achene pale, trigonous, about 1 mm. long, its short subulate beak about 0.2 mm. long; bristles filiforme, curled, only slightly roughened, rather longer than the achene.

Sierra Nevada, California. Type, preserved in the Dudley Herbarium of Stanford University, collected by J. W. Congdon on the Upper San Joaquin, Madera County, August 18, 1895.

Professor Fernald obligingly informs me that the plant recorded in Dr. Watson's Botany of California as *S. atrovirens*, collected by Mrs. Austin in Plumas County, is referable to the species here described; the Hall and Chandler specimen No. 217 from Pine Ridge, Fresno County, is the same.

Record may here be made that the Oregon plant collected by Howell and referred to *S. atrovirens* in Botany of California is *S. pallidus* (Britton) Fernald, as now determined by Professor Fernald; the Washington sedges recorded by Professor Piper as *S. atrovirens* are also *S. pallidus*.

These studies indicate that all records of *S. atrovirens* from the Pacific States are erroneous.

## PROCEEDINGS OF THE CLUB

### October 9, 1917

The meeting was held in the lecture room of the Department of Botany, Columbia University. President Richards called the meeting to order at 8:15 P.M. There were 14 members present. The minutes of May 23 were read and approved.

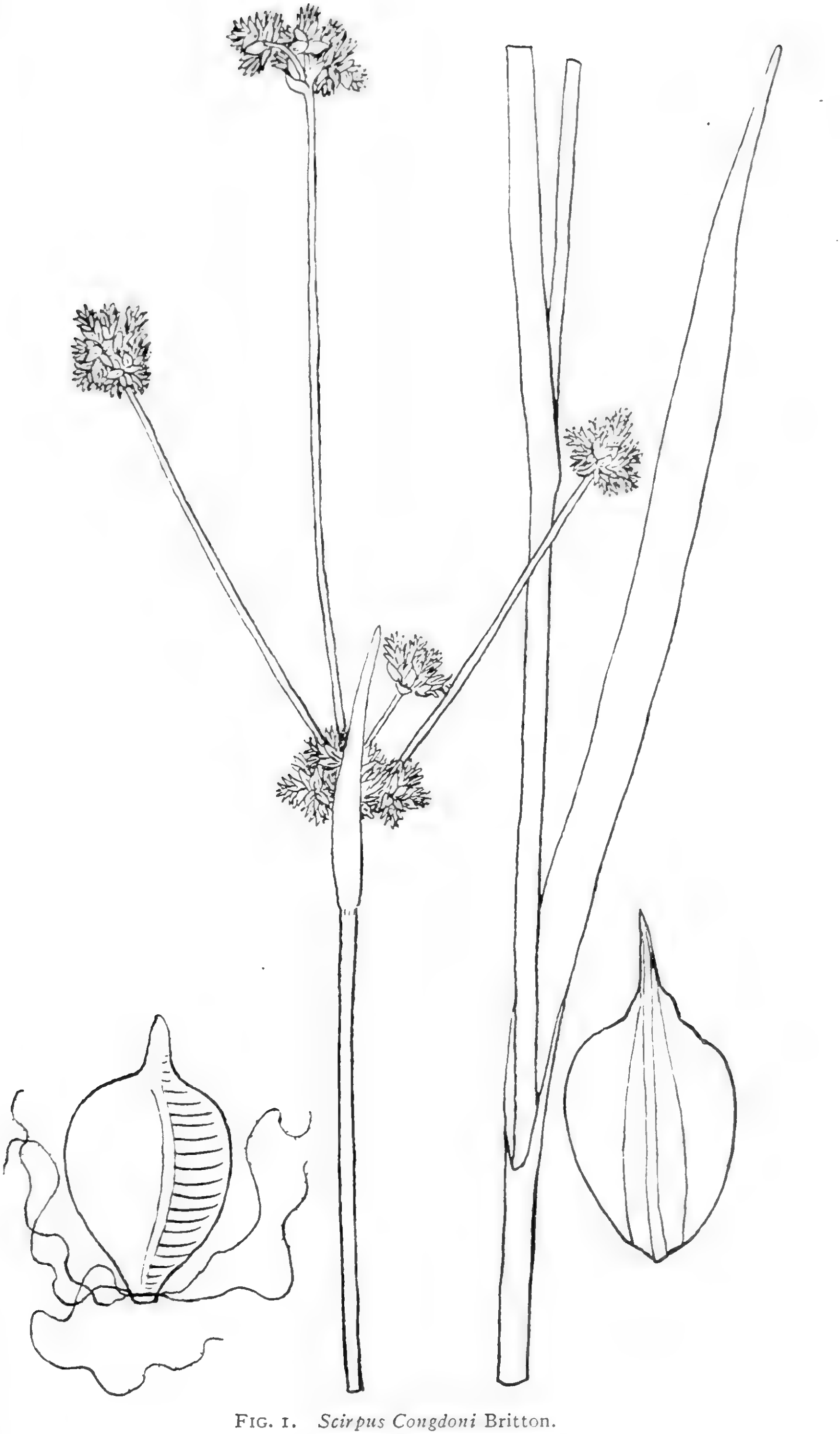

FIG. 1. *Scirpus Congdoni* Britton.

Dr. Stout proposed Professor W. T. Horne, Berkeley, California, and Mr. Wilson proposed Mr. R. Diamant, 2040 7th Avenue, N. Y. for membership.

Dr. M. A. Howe made a brief report on behalf of the committee appointed to make arrangements for the celebration of the fiftieth anniversary of the Club, after which it was voted to omit the usual Wednesday meeting of the Club this month.

The election of Professor Horne and Mr. Diamant followed upon the recommendation of Dr. M. Levine for the Committee on Admissions.

The scientific program consisted of informal reports by several members of the Club on their individual botanical experiences of the summer. The following members responded to the call of the President: Professor R. A. Harper, Dr. M. A. Howe, Dr. Beeman Douglass, Professor T. E. Hazen, Dr. M. Levine, Dr. R. M. Harper, Professor J. F. Adams and Professor H. M. Richards. Informal discussions followed each report.

Meeting adjourned at 10:00 P.M.

B. O. Dodge,
*Secretary.*

November 13, 1917

The meeting was held in the lecture room of the Department of Botany, Columbia University, at 8:15 P.M. President Richards presided. There were 40 persons present.

The minutes of the meeting held October 9 were approved. The following persons were nominated for membership: Professor C. R. Orton, State College, Pa., Professor W. C. Twiss, University of Utah, Salt Lake City, Professor Otis Caldwell, Lincoln School, New York City, Professor John Ritchie, 2 A Beech Terrace, Yonkers, N. Y., Mr. Robert Steinberg, Columbia University, N. Y. City, Miss Cornelia Carey, Ludington Road, West Orange, N. J., and Miss Rhoda Benham, Cedarhurst, N. Y.

The committee consisting of the Board of Editors and Dr. Britton, Professor Harper, Dr. Gager and Dr. Barnhart, appointed to consider the question of an abstract journal for botanical papers presented the following report which was read by Dr. Barnhart:

"The Committee on a Proposed American Botanical Abstract Journal voted, among other things, that—

"'This Committee considers an American Botanical Abstract Journal practicable, provided that it can be properly financed'; that

"'This Committee, while recognizing the value and need of an abstract journal, doubts whether this is a propitious time to appeal for endowment for this purpose'; and recommended

"'That Professor R. A. Harper, Dr. C. S. Gager, and Dr. J. H. Barnhart be appointed as representatives of the Torrey Botanical Club at any conference to be held at Pittsburgh during the coming Convocation Week leading to the establishment of an American Botanical Abstract Journal. Each of these representatives being authorized to select a substitute in case he is not present at Pittsburgh."

The report was approved and the recommendations were adopted by a vote of the Club. The Committee was continued.

The Committee on Admissions having approved the nominations made at the opening of the meeting the following persons were elected to membership: Professor C. R. Orton, Professor W. C. Twiss, Professor Otis Caldwell, Professor John Ritchie, Mr. Robert Steinberg, Miss Cornelia Carey, and Miss Rhoda Benham.

The scientific program consisted of an illustrated lecture on "An Account of a Visit to the Juan Fernandez Islands," by Dr. Carl Skottsberg.

Adjournment followed.

B. O. Dodge,
*Secretary.*

## NEWS ITEMS

Owing to the coal shortage Conservatory Range No. 2 at the New York Botanical Garden was cleared in December, the plants all being housed in the old conservatory range. On January 10 the Brooklyn Botanic Garden reduced by 375 linear feet its greenhouse space, thus crowding the collections in fewer houses, and necessitating the closing of the conservatories to the public.

On January 12 the second issue of the *Journal* of the International Garden Club was issued. Hereafter the publication will be issued quarterly in March, June, September and December.

The British government has ordered one hundred thousand kapok waistcoats for its sailors. This "vegetable wool," derived from *Bombax malabaricum*, has been suggested as desirable also for our own sailors.

The War Emergency Board of the American Phytopathological Society, which was organized at the Pittsburgh meeting during the holidays, held a meeting in Washington, February 9–11. The organization of this board is the result of a determination on the part of plant pathologists to do their part in winning the war. Certain problems of nation wide importance are being handled. At the special meeting reports on these projects were made. A census of all persons able to do pathological work is being taken and encouraging progress was noted. Other projects on Fungicides and Machinery, Emergency Research, Plant Disease Survey, and Crop Loss Estimates were considered at some length. Plant pathologists have in the war conditions a great opportunity for service to the commonwealth, for there is no more vital feature in maintaining maximum crop production than that of the reduction of leakage due to crop diseases. The board is working with all existing agencies of state and nation. The members of the board are H. H. Whetzel, Cornell University; F. D. Kern, The Pennsylvania State College; E. C. Stakman, University of Minnesota; H. P. Barss, Oregon Agricultural College; H. W. Barre, Clemson College; G. H. Coons, Michigan Agricultural College: and G. W. Lyman, U. S. Department of Agriculture.

Charles E. Faxon, the assistant director of the Arnold Arboretum died early in February at the age of 73. He was known throughout the country as a botanical illustrator, having made hundreds of notable drawings for Sargent's *Sylva* and many other books.

# The Torrey Botanical Club

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Vol. 18 March, 1918 No. 3

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EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873.

CONTENTS



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NORMAN TAYLOR

Brooklyn Botanic Garden

Brooklyn, N. Y

# TORREYA

March, 1918

Vol. 18 No. 3


## THE GENUS GLEICHENIA (DICRANOPTERIS) IN THE HAWAIIAN ISLANDS

By Vaughan MacCaughey

The pteridophyte flora of the Hawaiian Archipelago comprises 43 genera and 185 or more known species; of these 2 genera and 118 species are endemic. There are 18 genera with 75 per cent. or over of endemic species; 18 genera either possess no endemic species, or have 75 per cent. or over of non-endemic species.* In this rich and extremely interesting fern flora the genus *Gleichenia* (*Dicranopteris*) holds a unique position with reference to range and ecology. Whereas the great majority of the Hawaiian ferns are of small stature and of scattering occurrence, the Gleichenias form solid and extensive thickets and jungles, almost impenetrable (owing to the peculiar growth-habits of these plants), and occupying hundreds of acres. There are four species in the Hawaiian flora, of which two are endemic, and two are found in other countries. The ubiquitous and dominant character of *Gleichenia dichotoma*, for example, has made it a serious pest in the montane forests. The Gleichenias, in terms of both bulk and area, are at the present time the most abundant ferns in the Hawaiian forests, not even excepting the tree-ferns,† which were formerly much more plentiful than at present.

It is the purpose of the present paper to give a succinct account of this remarkable fern genus, with descriptions of the Hawaiian

* For further data see MacCaughey, Ecological Survey of the Hawaiian Pteridophytes, Journal of Ecology; in course of publication.

† MacCaughey, The Tree Ferns of Hawaii, American Botanist 22: 1–9, 1916, 2 figs.

[No. 2, Vol. 18 of Torreya, comprising pp. 21–40, was issued 8 March, 1918.]

species, and with special emphasis upon the ecological features of these plants. There is nowhere in the literature a comprehensive account of this group in Hawaii. The present material is based upon field studies throughout the Islands during the past nine years.

The genus *Gleichenia* J. Sm. was named in honor of Friedrich W. Gleichen, a German botanist, 1717–1783. It comprises 25 or more species, which are abundant in many tropical countries, in subtropical eastern Asia, and also in moist situations in the southern hemisphere. The taxonomic status of many of the species and varieties is still unsettled, and it is entirely probable that the genus is much larger than is commonly stated. One species, *flexuosa*, has been recorded from Louisiana. The writer has retained the old name *Gleichenia,* in preference to the modern *Dicranopteris*, because the former is so thoroughly incorporated into the literature, and because it is used in the standard flora of the Hawaiian Islands, that of Hillebrand.

The Gleichenias are all characterized by their habit of growing in dense thickets. The development of the leaves is very distinctive. The foliage is woody and perennial, and growth is indeterminate. The dichotomously branching apical regions resume growth season after season, so that in some species the long, trailing, vine-like leaves attain lengths of *over 100 feet.* The pinnae are pinnatifid, with segments either small and concave-orbicular, or pectinate and elongate. The Gleichenias are noteworthy in possessing two leaf-characters which indicate a very primitive condition—the striking and unparalleled dichotomous branching of the frond, and the frequent development of subsidiary pinnae between the ordinary ones. The leaves of most species are repeatedly dichotomous; the ultimate branches bear pinnately arranged pinnules.

All four species are known to the native Hawaiians by the name of *Uluhe; Unuhe* and *Enuhe*, sometimes used, are variants of this. The English name is "Staghorn Fern," referring to the branched leaves, or "Wire Fern," referring to the wiry petioles.

In *Gleichenia* the sori are subglobose, and comprise 2–6 nearly sessile sporangia, seated on the apex or back of a vein. Each sporangium is surrounded by a broad, transverse, equatorial annulus, and opens vertically.* The spores are ovoid or tetrahedral, without chlorophyll and with a single dorsal line.

### 1. Gleichenia Hawaiiensis Hook.

*Dicranopteris Hawaiiensis* (Hook.) Robins.; *Mertensia Hawaiiensis* Brack.

Petiole rough, compressed, and margined with two lines of small scales. The leafy portion is 3 or 4 times dichotomous at somewhat acute angles. All of the divisions are pectinately pinnatifid down to the rachis. There is a bud in each fork, covered with small (1½–2 lines), falcate, acute, dark, ciliate scales. Ultimate divisions of the leaf-blade are linear-lanceolate, 6–12 inches long; their segments are linear, rather acute, subcoriaceous, dark-green, ½–1½ inches long, their under side, and more so the rachis, chaffy with laciniate ferruginous scalelets. The veins are vertical, with 2 or 3 branches. The sori are on raised punctiform receptacles, copious and close, with 3–6 sporangia in each sorus; often the sporangia are irregularly scattered. Annulus indistinct; spores compressed.

This species occurs on all the islands, at elevations of 3,000–6,000 ft., but is rare. Typical stations are: Halemanu, Kauai; Ka-ala and Kona-hua-nui, Oahu; Pele-kunu, Molokai; Eeke, West Maui; and Mauna Kea, Hawaii. It is distinctly a plant of the montane rain-forests, and does not descend to the lower levels or give any evidence of xerophytic tendencies. It is endemic, but according to Hillebrand is closely related to *G. flagellaria* Spring., which extends from Madagascar and Malaysia up through southern Polynesia. It is notably shade-tolerant, and does not form large thickets, but grows in isolated clumps here and there in the forest. Its distinctive feature is that all or most of the petiole branches are foliose.

### 2. Gleichenia longissima Blume

*Dicranopteris glauca* (Thunb.) Underw.; *Gleichenia glauca* Hook.; *Mertensia glauca* Brack.; *Mertensia pinnata* Kze.

*F. O. Bower, Studies in the Morphology of Spore producing Members. IV, The Leptosporangiate Ferns, Phil. Trans. Roy. Soc., Series *B*, Vol. 192: 29–138. 1899.

Petioles repeatedly dichotomous, the last branches bearing a pair of bipinnate pinnae. The bud in the axil between these pinnae is densely covered with stiff, black, ovate pubescent scales, which are about 1 line long and cordate. The rachides are plano-convex and sparingly clad with scales like those of the bud. The tender tips of the pinnae are tomentose with light-brown cobwebby wool. The pinnae are subcoriaceous, glaucous beneath, oblong, 2–4 ft. long, and broadest about the middle. The pinnules are 40–50 on a side, linear, 6–9 inches by ½–2 inches, subsessile or shortly stipitate, with an even-sided truncate base, acuminate, deeply pinnatifid to the rachis near the base. The ultimate segments are linear, 1–1½ lines broad, obtuse; the lowest pair longest and often reflexed over the rachis. Veins distinct, almost vertical, simple, or forking near the base. The sori are dorsal on the anterior branch or at the fork, frequently one to each vein, each comprising 3 or 4 sporangia.

This species, although nowhere abundant, occurs on all the large islands of the group, in the rain-forests, at elevations of 2,000–4,000 ft. It is also native to Japan, China, Malaysia, tropical Australia, and Polynesia. The Hawaiian Islands represent its northernmost geographic limit in the Polynesian area. It is often found in the same habitats as *G. Hawaiiensis*, but does not mingle with the latter, and is readily recognized by its bipinnate frondose portions. On the island of Oahu it is not uncommon along the summit ridges of the main ranges, Ko'olau and Waianae, and appears to maintain itself successfully along the wind-swept crests and windward precipices. It forms much larger clumps or thickets than does *G. Hawaiiensis*, but never makes the extensive jungles on the lower skirts of the forests, as does *G. dichotoma*.

### 3. Gleichenia emarginata (Brack.) Hbd.

*Dicranopteris emarginata* (Brack.) Robins.; *Gleichenia dichotoma* Hook. var. *emarginata* Hbd.; *Mertensia emarginata* Brack.

This species closely resembles *G. dichotoma*, but is a much larger and stouter plant. The petioles are muricate at the base, and are scantily villous. The leaf-blades are thick coriaceous, and conspicuously tomentose underneath with a brown wool composed of branching hairlets. The last branches are 9–12 inches by 3–4 inches; segments emarginate or bifid, the outer one (basal) pectinate or pinnatifid. The veins are prominent above, sometimes uniting to form a costal areole. A distinctive feature of this species is that all of the buds are enclosed between 2 small but leafy, ovate, crenate bracteal leaflets. Most of the leaves are spore-bearing, whereas *G. dichotoma* is rarely found so.

This easily recognized species is endemic. It occurs on all the islands, on open mountain ridges and in clearings in the forests, at elevations of 1,000–3,000 ft. Although it is much more abundant than the two preceding species, it is much less plentiful than is *G. dichotoma* which is the dominant species in the Islands.

*G. emarginata* shows a slight tendency toward semi-xerophytic habitats, often growing in clearings and on dry ridges that are much more xerophytic than the forest-lands immediately adjacent to them. It often forms very dense and impenetrable tangles, which may cover areas of many square rods.

### 4. Gleichenia dichotoma Hook.

*Dicranopteris linearis* (Burm.) Underw.; *Mertensia dichotoma* Willd., Gaud., Brack.; *Polypodium dichotomum* Thunb. and Forster.

This species, which occurs in many of the islands of the Pacific, and in tropical countries throughout the world, has become such a pest in the Hawaiian forests that a detailed description seems pertinent. Many of the features enumerated below are also applicable, in greater or less degree, to the other Hawaiian species of *Gleichenia*.

The rhizome either runs along the surface of the ground, or is wholly subterranean. On rocky or impervious material the rhizome is aerial, but closely appressed to the substratum and affixed thereto by numerous short, tough roots. In earth or mud it penetrates to a depth of from 4 to 15 inches, running horizontally and showing only the leaves above the surface of the soil.

The rhizome is 1/8 to 1/4 inch in diameter, terete, and of indefinite length. Its appearance has been aptly compared with stout copper wire. Rhizomes 10 to 15 feet long are not uncommon, and under favorable conditions may become very much longer. The rhizome is more or less highly ramified—when soil conditions are favorable the branches form an intricate, tough, close-meshed network below the soil. The color is glossy dark chestnut brown; the extreme terminal portions are tender and pale green. The surface of the rhizome, although apparently smooth, upon close examination is found to be sparsely clad with short, brown, shining, appressed hairs. On the younger portions these hairs are arranged in star-like tufts. In texture all portions of the rhizome except the growing tips are very tough, wiry, and bamboo-like; this is due to the abundant deposition of sclerenchymous material in the cortical regions. [illegible] discussion

In cross-section the rhizome shows a heavy, woody cortex, surrounding a soft, pale green stele. A single axial bundle traverses the rhizome, and is separated from the cortex by a distinct endodermis. Within the latter is a pericycle of several layers of cells, within which is a continuous zone of phloem, containing large and small sieve-tubes and phloem parenchyma.*

On the rhizome are four kinds of structures, in various stages of development—branches of the rhizome; leaf-buds; leaves, and roots. The roots are numerous and arise irregularly along the rhizome, chiefly along its lower surface. They are short (1–6 inches), sparingly branched, woody, and brown. The tips of the larger roots are greenish or pale.

The leaf-buds are also scattered irregularly along the rhizome; on the average they are not more than 3 inches apart. The buds are ¼–½ inch long, slender, obtusely pointed, soft, tender, and densely clad with brown hairs similar to those on the rhizome.

The rhizome-branch buds are similar in appearance and distribution to the leaf-buds; they are not as numerous, however, as the latter, and give rise to the branches of the rhizome. Their growth plane is horizontal, while that of the leaf-buds is vertical.

* See further G. Poirault, Recherches d'histogénie végétale. Developpement des tissus dans les organes végétifs des cryptogames vasculaires. Mém. de L'Acad. imp. des sciences de St. Pétersbourg, ser. 7, t. 37, 1890.

L. A. Boodle, On the Anatomy of the Gleicheniaceae, Annals of Botany **15**: 703–747, 1901.

Although the characteristics of the rhizomes contribute in no small degree to the success of this domineering plant, the leaves are the main visible feature. The petiole closely resembles the rhizome in size, color, and texture. It is slender, $\frac{1}{8}$–$\frac{1}{4}$ inch in diameter, and of variable height depending upon ecologic conditions. The height varies from a few inches to 10 or 15 feet; plants clambering up into trees and bushes often have petioles much longer than this. The petiole is terete, not sulcate, flexuose below, and notably erect and rigid. It is smooth, hard, tough, and brittle. Its texture and surface is much like that of bamboo; at the forks and buds it is wooly-tomentose. In cross-section the petiole much resembles the rhizome.

The young petiole looks like an erect piece of heavy green wire, 10–30 inches high, and rolled at the apex into a tight spiral about 1 inch in diameter. The petiole-base is brown and hard, the upper portion and spiral are quite soft and green. All parts are glabrous except the spiral, which is sparingly clad with appressed brown hairs. The spiral unrolls and bifurcates, repeatedly forking in the upper portion at open angles, the ultimate pair of branches frondose.

On the summit of the petiole is the leaf-blade or frondose portion. This comprises a series of dichotomously branching ramifications. The lower are the largest and most mature, the upper tiers or strata of pinnae are progressively younger. In the axil of each bifurcation is a small bud, covered with brown wool; by means of these buds the growth may continue more or less indefinitely. Usually the bud in the first or lowest fork develops into a strong rachis, also dichotomously branching, and giving the leaf a loosely pinnate appearance. The leaf may thus have three or more tiers of pinnae, with a total of several hundred pinnae.

Each pinna or frondose branch is rigid, chartaceous, glaucous underneath, glabrous, elliptico-oblong, 6–9 inches long and $2\frac{1}{2}$–4 inches wide, broadest about the middle. The pinna is divided down to the rachis into closely set, blunt pinnules; these are at right angles to the strong midrib, and are linear, $1\frac{1}{2}$–3 lines broad, entire, obtuse or emarginate. The inner or upper pinnules shorten toward the base; the lowest one on the outside is deflexed and generally larger, crenate or pinnatifid. At the base of each bare forking or bifurcation there is a pair of smaller lateral pinnules. The lateral pinnules are of varying sizes, the lower ones often equal to the frondose branches; the upper reduced, crenate, or even subentire. The veins have 3–5 parallel branches.

The pinnules unroll as they mature, the young leaves or leaflets being readily recognized by the rolled tips of the pinnules, and by their pale green color. The maturing leaflets are strongly and rigidly deflexed, so that usually the center of the leaf is noticeably higher than the peripheral parts. This doming of the leaf give the *Gleichenia* thicket a characteristic scalloped or hummocky appearance.*

The sori are of 10–12 sporangia, and are seated on the middle of the anterior veinlet. The sporangia are sessile, with a very wide complete ring, which opens by the separation of two joints.†

The petioles of *uluhi* (to use the convenient Hawaiian name) are so woody and elastic and the blades so coriaceous that the dead leaves form a massive, resistant part of the thicket. Upon death the leaves do not fall or break, except through mechanical injury, but remain erect, their blades interlocked with the living fronds. Gradually the latter rise above the dead leaves, so that a vertical section of an *uluhi* thicket shows a canopy of living leaves surmounting and masking a woody jungle of dead foliage.

The general color effect of *uluhi* is a clear, bright, yellow-green. The yellowish constituent is conspicuous, particularly in the young foliage. An *uluhi* thicket contrasts strikingly with the heavy green of the *lehua* (*Metrosideros polymorpha*), the gray green of the *koa* (*Acacia koa*), or the silver green of the *kukui* (*Aleurites Moluccana*), common trees with which it is often asso-

* Hillebrand suggests that whenever the lateral pinnules are large and deeply divided the lowest outer segments of the frondose pinnae are likewise, only in a less degree, suggesting the idea that the former are in reality only the lowest segments of an otherwise aborted frond or pinna.

† For the development of the prothallium see N. W. P. Rauwenhoff, La génération sexuée des Gleichéniacées. Archives Néerlandaises des Sciences exactes et naturelles, t. **24**: 157, 1891.

ciated. Dead *uluhi* is at first chocolate-brown, gradually bleaching to a peculiar dull gray-brown. These colors are so distinctive that a patch of living or dead *uluhi* may be easily recognized at a distance of several hundred yards.

A single *uluhi* thicket varies in depth from 2 to 8 ft., depending upon topography, and in area from a few square feet to several hundred square rods. The ticket comprises three strata or layers. Uppermost is the closely interlaced canopy of living leaves, beneath which is much dead material. This canopy is strongly supported by innumerable slender petioles, which are woody and elastic. The third stratum is the subterranean network of rhizomes.

The interlocking leaves and woody petioles render the *uluhi* thicket exceedingly difficult of penetration by the mountaineer. To break trail through this material is very arduous and fatiguing. The experienced mountaineer will always walk around, rather than attempt a way through. One is continually tripping over the unyielding petioles, and wounding oneself upon the sharp pseudo-spines. The ramifications of the older leaves often break off close to their points of origin. This produces short, sharp pseudo-spines, that are strong and rigid, and that often cause painful wounds. Mountaineers who have not examined the *uluhi* carefully are often under the impression that the plant is actually thorny or spiny. The silicious cortex of the petioles is so dense that the fragments wound like bamboo or glass.

In the forests, and along wooded ridges, the *uluhi* often assumes a climbing habit. The petioles and rachides become greatly elongate, so that a single leaf may attain the length of 20 or more feet. The ramifications continue indefinitely. The leaves clamber up over bushes and into the trees, but rarely rise over a height of 15 ft. There are no special climbing structures—the wiry petioles and rigid leaflets are well adapted to entangle and mount upon other vegetation. This leaning or semi-climbing habit is detrimental to the plants which are used for support, and distinctly assists the *uluhi* in smothering other vegetation and monopolizing new territory.

*Uluhi* is notably free from insect pests and fungus diseases.

It grows vigorously and without apparent intermission. There is no special evidence of a resting period; the production of new leaves and the extension of the rhizome is ceaseless.

*Uluhi* occurs throughout the humid and semi-humid regions of all the largest islands of the group, from 500 to about 3,000 feet above sea-level. It never appears upon the littoral, and does not grow well upon the lowlands below 500 feet. Neither does it ascend the higher mountains, but is most abundant between 800 and 2,200 feet. It is not found in the strictly arid regions. It reaches its optimum development in the clearings in the native forests—clearings that are sufficient to give it abundance of sunlight, but that leave enough forest to afford protection from the wind. It is partially shade tolerant, but does not grow well under the heavy canopy of the unbroken rain-forest. It is hygrophytic, but not strongly so, and will maintain itself successfully on semi-xerophytic slopes and ledges.

*Uluhi* is associated with the rugged topography of the montane forests, and is characteristic of steep declivities, ridge crests, valley walls, and similar situations. It is not prevailingly a plant of flat land and does not appear to seek such localities. The chief competitor of *uluhi* in the forest clearings is the pestiferous Hilo grass (*Paspalum conjugatum*), an introduced species that has become a serious menace in the forests. Hilo grass forms a very dense, impenetrable sod, which, like the *uluhi*, effectually prevents the growth of seedlings of the native trees or shrubs. *Uluhi* can and does drive out the Hilo grass.

The *uluhi* usurps the territory of the native undergrowth in two ways: root competition and smothering. By root competition is meant the slow, inexorable spread of the rhizomes into new territory. This takes place along the entire periphery of an *uluhi* thicket, and is irrestible by all other vegetation save large trees and bushes. The tough, woody branching rhizomes are able to literally oust all other roots. The mechanical occupation of the soil by the *uluhi* rhizomes is thorough and complete and results finally in an absolutely pure formation.

Concomitant with the subterranean invasion is the smothering action of the masses of wiry, interlocking foliage. The erect petioles form serried ranks of slender, durable columns; the tiers of tough foliage interlace into a dense canopy that excludes all direct sunlight from the ground below. It is practically impossible for any seed-plant to germinate and grow up through an *uluhi* thicket—the ground is wholly occupied by rhizomes, and the leaf-canopy means light starvation to any struggling seedling.

*Uluhi* usually begins its invasion of a new area from the upper portion of the slope, and gradually extends its range down the hillside and over the ridge, obliterating all other vegetation save trees and bushes. The damage which *uluhi* has done to the native forests is difficult to estimate. It may be safely stated that thousands of acres, once occupied by diversified indigenous and endemic flora, are now covered by practically pure stands of *uluhi*. From the standpoint of forest management *uluhi* is an undesirable intruder, as it thoroughly prevents the development of seedling trees in the regions which it has preëmpted. Furthermore, the large amount of dry woody material in *uluhi* thickets is much more dangerous from the standpoint of forest fires than is the sappy, non-combustible vegetation of the rain forests.

*Gleichenia dichotoma* has completely taken possession of a very considerable proportion of the Hawaiian trails. It should be noted that many of the Hawaiian mountains are deeply carved by valleys and gorges, which are separated from one another by narrow and precipitous forest-clad ridges. The old native trails ran along the crests of these ridges. When cattle, sheep, and goats were introduced, in the latter part of the eighteenth century, and permitted to roam and breed unchecked, these animals increased in prodigious numbers. They made serious inroads upon the native forests, following the ridge-crests and contour lines and destroying the underbrush. The *uluhi*, hitherto held in repression under the forest cover, rapidly invaded the clearings made by the cattle and goats, overran these places, and invaded the rapidly receding native forests.

It is difficult to give a quantitative idea of the present extent of *uluhi*. It forms more or less pure stands along scores of miles of native trail, and over thousands of square rods of valley wall and hillside. In many instances it has filled small valleys from side to side.

The Gleichenias are not utilized in Hawaii in any way. The *uluhi* is eaten by cattle and goats, in the absence of more desirable forage. The petioles, if properly gathered and prepared, would undoubtedly be excellent material for the manufacture of light basketry. At present *uluhi* is an undeveloped resource.

College of Hawaii,
Honolulu, Hawaii

## BRYOLOGICAL NOTES

### IV. A New Hybrid in Physcomitrium

By A. LeRoy Andrews

Begun in the fall of 1912 and resumed in the spring of 1913, a considerable reclamation project was carried out in Ithaca, N. Y., as a result of which a tract of cat-tail marsh at the head of Cayuga Lake was converted into something more nearly approaching *terra firma*. The new soil was a very fine silt pumped from the Inlet by suction-dredge. Among the bryophytes which immediately established themselves upon it, *Physcomitrium* species were especially well represented. Material collected in the autumn of 1913 shows abundance of *Physcomitrella patens* (Hedw.) Br. & Sch. together with some *Aphanorhegma serratum* Sull. and *Physcomitrium immersum* Sull. Occasionally also a strange emergent capsule was noted, not identifiable with any moss-species, but obviously a hybrid. These capsules were not well matured and were so sporadic in occurrence that it was difficult to collect satisfactory material for their study, but finally at a point where the more clayey soil of the hillside projected out into the new silt covering they were found in greater number. At this point were found the following spring (1914) capsules of *Physcomitrium turbinatum* (Michx.) Brid. together with those of *Physcomitrium Hookeri* Hampe.* The ♀ parent of the hybrid was clearly *Physcomitrella patens*, the ♂ parent was evidently *Physcomitrium turbinatum*. The description follows, the sporophyte alone partaking of the hybrid nature, the gametophyte

* The station for *P. Hookeri* is, so far as I know, the first east of Ohio.

upon which it occurs being of course that of *Physcomitrella patens:*

*Physcomitrella patens* ♀ × *Physcomitrium turbinatum* ♂. Sporophyte altogether about 2.5 mm. high, the capsule exserted upon a seta longer than itself. Vaginule swollen at base, abruptly contracting to the base of the seta; the latter strongly pigmented dark brown in its lower $\frac{1}{4}$–$\frac{1}{3}$, above green, about 1.25 mm. to the base of capsule. Capsule pyriform with neck fairly long and contracting gradually into seta, about twice as high (1 mm.) as wide, blunt at apex, light yellow in its immature condition. Stomata rather few at base of capsule, of normal *Funariaceae* type with completely coalesced guard-cells, pigmented yellow, nearly round, about 35 $\mu$ in diameter. Exothecial cells nearly rectangular to slightly pentagonal or hexagonal, arranged in definite latitudinal zones, thin-walled, about twice as long as wide (50 × 25 $\mu$), lid not clearly separated, but exothecial cells in upper part of capsule somewhat abruptly shortening, so that their length does not exceed their width, also slightly thicker-walled and more strongly pigmented yellow. Spores formed, but entirely immature.

As the material was collected in November shortly before the breaking of winter, and *Physcomitrella patens* is apparently an annual, it is rather doubtful if any of the hybrid capsules matured their spores, and unfortunately no attempt was made to mature them indoors. The whole matter of moss-hybrids is relatively uninvestigated. They have been noted most frequently, in fact almost exclusively, in Europe, whose moss-flora has been more intensively studied. Even there the only cases of hybrids which are well substantiated are those between cleistocarpous forms with sessile capsule and the related forms with seta and more highly organized capsule, the intermediate capsule being in these cases distinct enough to readily attract attention. Such hybrids have been described in the series *Pleuridium-Ditrichum*, *Astomum-Weisia-Trichostomum* and *Physcomitrella-Aphanorhegma-Physcomitrium.* Whether the hybrid spores can produce new plants and what the nature of such plants might be is, so far as I am aware, entirely unknown, so that speculation as to what part hybridization may have played in the evolution of new moss-species is at present premature.

The hybrid which stands nearest to the one described above is *Aphanorhegma serratum* ♀ × *Physcomitrium turbinatum* ♂ described by Mrs. Britton from Drummond's specimens collected near St. Louis.* Mrs. Britton also refers to the European *Physcomitrella patens* ♀ × *Physcomitrium sphaericum* ♂, called *Physcomitrella Hampei* by Limpricht (1885). It seems a question whether the series of forms within which hybridization very certainly occurs should not be regarded as falling within a single natural genus, and I should be inclined to so include *Physcomitrella* and *Aphanorhegma* within *Physcomitrium*, over which name *Gymnostomum* has priority, as Lindberg insisted.

ITHACA, N. Y.

## A NEW VARIETY OF RUBUS PARVIFLORUS

BY J. K. HENRY

RUBUS PARVIFLORUS Nutt. var. **Fraserianus** var. n.

Distinguished from the species by having the petals laciniate-dentate on their outer half. Ucluelet, Vancouver Island, B. C.; June 19, 1917, J. K. Henry; June 20, 1917, George Fraser. These collections were made on both sides of Ucluelet harbor, but Mr. Fraser, who directed my attention to this unusual form, informed me that it is not common. As the plant has leaves rather densely pilose beneath and the lower part of the sepals hardly glandular, it might be considered a variety of *Rubus velutinus* H. & A. (*R. Nutkanus* Moc. var. *velutinus* Brewer), but it does not seem advisable to maintain two species. The

* Bull. Torrey Club, XXII, 65 f. 1895. The differences between *Physcomi, trella patens*, a plant of the three northern continents, and *Aphanorhegma serratum* which is peculiar to North America, are well brought out by Mrs. Britton in the same volume, pp. 62 ff. with plates 229, 230. My observations are entirely in agreement with her results, except that I find no incipient differentiation of a lid in either European or American *Physcomitrella* and I do not find its stomata at all immersed, but quite normal.

FIG. 1. *Rubus parviflorus Fraserianus.* J. K. Henry.

accompanying photograph made by Mr. Fraser shows fairly well how the variation gives an added charm to this beautiful plant.

VANCOUVER, B. C.

# REVIEWS

### Robbins's The Botany of Crop Plants*

This book contains a mass of information concerning tropical as well as temperate forms, and cannot help but prove invaluable to students and teachers in agricultural schools and colleges, to workers in agricultural experiment stations, and to all persons interested in cultivated plants. While the book is, in the nature of the case, largely a compilation, the author has apparently made the subject-matter his own. The treatment is concise, as complete as should be expected, and about as interesting as such material can well be made. The author intends the work as a textbook, and Part II, which treats the economic plants by families, is deemed by him sufficient for a course of one half year, involving one recitation and two laboratory periods per week.

In the preparation of the book, the author has had in mind non-agricultural as well as agricultural schools, for, he says (p. v), "it cannot escape notice that there is a growing tendency, wherever botany is taught, to tie it up more closely with economic interests." Undoubtedly this is so, but the reviewer cannot but consider that it would be pedagogically and scientifically unfortunate for a student to get his conception of the nature and scope of botany as a science from any specialized treatment of only one group of plants. Such a course has too great limitations to be adequate for purposes of general culture, or as an introduction to the methods and scope of botanical science. In other words, it would seem to the reviewer unfortunate for students in agricultural colleges to be introduced to botanical science by such a course in applied botany as is presented in the book under review, or any other book of similar scope and aim. This view appears also to be in harmony with that of the author.

As the author suggests in his preface, the use of his Part II will, in most schools, be preceded by a general course, aiming "to give the student a survey of the plant kingdom and an acquaintance with the large outstanding facts and principles of botany."

* Robbins, Wilfred, W., The Botany of Crop Plants, pp. i–xix + 681, Figs. 263, Philadelphia, P. Blakiston's Son & Co. $2.00 net.

No class of students are more in need of such a survey and acquaintance than are those in our agricultural schools and colleges. It may not be essential to being a farmer, but the aim should not be to make the graduates of our agricultural colleges merely farmers, nor merely good farmers.

The reviewer has made running notes as follows:

On page 9 protoplasm is described as "a very complex chemical substance," but the tabular analysis of a unit of protoplasm on the opposite page gives the more nearly correct impression of protoplasm as a complex physical system, comprising many chemical compounds.

Chapter IV, Stems, seems specially clear and satisfactory.

The statement (p. 46) that "carbohydrates are made . . . only by those cells of green plants that possess chlorophyll" should be qualified. All cells make cellulose, and many classes of non-chlorophyll-bearing cells manufacture sugar from starch. The non-green cells of the potato tuber (one example of thousands) normally make starch. The author doubtless refers to the primary elaboration of carbohydrates out of inorganic elements, but freshmen have not yet become such carping critics as reviewers, and might be misled by the statement as it stands.

The pollen tube does not always enter through the micropyle, even in cultivated plants (p. 52). The sperm nucleus does not contain paternal "characters," nor does the egg-nucleus contain maternal "characters," but only the determiners or genes of those characters (p. 52). The use of the term "embryo nucleus" for oösperm (oöspore, zygote) (p. 53) is unusual if not unique, and not accurate nor adequate. The use of the term "Pteridophytes" to include Calamophytes and Lepidophytes (pp. 62 and 64) is archaic, or rapidly becoming so. *Zea Mays* is correct, not *Zea mays* (p. 178).

Yellow sweet clover is not *Melilotus alba* (legend of Fig. 183, p. 435). This is obviously an oversight, for the author is elsewhere correct on this point.

The bibliographies at the end of each chapter will prove very helpful, and contain many citations to literature as late as 1917.

The book is a mine of information hitherto available only in scattered sources; and the wonder is that the need for such a book in agricultural colleges was not met several years ago.

C. STUART GAGER.

#### Weaver's Study of the Vegetation of Southeastern Washington and Adjacent Idaho; and Ecological Studies in the Tension Zone between Prairie and Woodland, by Weaver and Thiel

After thirteen years of quiescence, a notable series of publications of the Botanical Seminar of the University of Nebraska has been revived by a new generation of ecologists and phytogeographers. The second paper noted above is number one of the new series of "Botanical Survey of Nebraska," the last of the old series being published in 1900 as the second edition of "Phytogeography of Nebraska I," originally issued in 1898.

Considering the last paper first, the authors show that in the tension zone between forest and prairie the lack of available water and high transpiration on the latter explains the failure of the trees to encroach seriously over the prairies, except in gullies and other favorable places where there is water. A system of records showing available water supply and transpiration, and the reflection of these factors in the vegetation itself, are described in detail, the whole paper covering 60 pages, with numerous pictures, tables and graphs to illustrate the points discussed. In this connection some of the conclusions of Gleason, Harper, Shimek and others should be studied by those who may not be inclined to ascribe as much importance to water as the authors of the paper under discussion evidently do. They make scarcely any mention of fire as a factor, whereas some writers consider it almost *the* factor. They promise, however, to carry out a series of "carefully planned quadrat studies" to answer the question "Can trees grow from seed sown in the prairie or worked into the surface soil and under what conditions?"

The other paper by Dr. Weaver is a pamphlet of 133 pages and 48 illustrations, and is a systematic description of the vegetation of southeastern Washington and eastern Idaho. That such a region contains vegetation described under prairie-plains formation, desert-scrub formation, Pacific coast forest formation, Hydrosere, etc., bears out the author's statement that the area is of unique interest to the ecologically minded. Except taxonomic publications, there has been practically nothing written about this area, so that Dr. Weaver's article is doubly welcome.

In both of the papers many terms sanctioned by Professor Clements in "Plant Succession" are freely used and of course the concept of a plant association as an organism is adhered to, even in such a paper as the one by the senior author which is chiefly descriptive.

N. T.

## PROCEEDINGS OF THE CLUB

### January 9, 1917*

The annual meeting was held in the American Museum of Natural History, Tuesday, January 9, 1917, at 8:15 P.M. President Harper presided. Nineteen persons were present.

The minutes of the meetings held November 29 and December 12 were read and approved.

The chairman of the standing committees for the year presented brief reports. Dr. Barnhart for the finance committee; Mrs. Britton for the program committee; Percy Wilson, field committee; Dr. Britton, local flora; Mrs. Britton, Cryptogams. These reports were accepted with approval.

The reports of the officers of the Club were then presented. President Harper spoke of the growing condition of the Club and urged increased activity on the part of the younger members especially.

The secretary's report was read and accepted.

The report of the treasurer was referred to an auditing committee consisting of Dr. J. H. Barnhart and Dr. M. A. Howe.

The report of the editor, Dr. A. W. Evans, was read by the secretary and ordered placed on file.

Dr. J. H. Barnhart, delegate to the Council of the New York Academy of Sciences, submitted a report, which was accepted.

Under the head of new business the question relating to the financial condition of the Club as indicated by the treasurer's report was considered.

* Should have been printed in Torreya for April, 1917.

Dr. Britton submitted the following propositions which were adopted:

1. Each member to be invited to nominate at least one person for membership.

2. The list of sustaining members to be increased by invitation. The finance committee to determine the necessary steps to be taken in this regard.

3. To inform the board of editors that the Club cannot pay, under the present conditions, for the publication for the *Bulletin* of more than 575 pages and 25 plates per volume and 250 pages with a corresponding reduction for illustrations for TORREYA.

The election of officers resulted as follows:

*President*—Herbert M. Richards.
*Vice-Presidents*—John H. Barnhart,
C. Stuart Gager.
*Secretary-Treasurer*—Bernard O. Dodge.
*Editor*—Alexander W. Evans.
*Associate Editors*—Jean Broadhurst,
J. Arthur Harris,
Marshall A. Howe,
Michael Levine,
Arlow B. Stout,
William G. Marquette,
Norman Taylor.
*Delegate to the Council of the New York Academy of Sciences*—Marshall A. Howe.

Meeting adjourned.

B. O. DODGE,
*Secretary*

NOVEMBER 28, 1917

The meeting was held in the morphological laboratory of the New York Botanical Garden at 3:30 P.M. Vice-President Barnhart presided. There were 12 persons present. The minutes of the meeting held November 13 were read and approved.

Mrs. Britton reported that the program committee had arranged for a symposium on vacant lot and school gardens to be held December 11. The request that the program committee call the meeting at 8:00 P.M. instead of 8:15 P.M. was granted.

A motion to omit the Wednesday afternoon meeting in December was carried.

Mr. Abram Schulz, 666 Flatbush Ave., Brooklyn, was elected to membership. The resignation of Miss Edna Adams was read and accepted.

Dr. Marshall A. Howe, who acted as secretary at the semi-centennial meetings, read the minutes of the meetings held October 18, 19 and 20. Dr. Britton reported that the Semi-Centennial Fund now amounted to about $2,100.

The first number on the scientific program was a paper on "Notes on a Carrier of the Mosaic Disease," by Mr. M. Nishimura. This paper will be published in full in the BULLETIN.

Dr. F. J. Seaver was not able to be present. He had consented to exhibit a specimen of a rare cup fungus.

Dr. A. B. Stout then read a paper on "Axial Proliferation in the Flowers of *Hibiscus*." An abstract prepared by the speaker follows.

The most complex "growth observed consisted of numerous branches bearing green leaves and well-developed flowers all very closely compacted and enclosed in a space between the cells of the fruit. The most simple proliferation observed consisted of a small rudimentary and solitary carpel of a pistil.

"These proliferations have been numerous for nearly all plants of *Hibiscus oculiroseus* which have been grown at the New York Botanical Garden. The number of pods with proliferations varies greatly among different plants and also for the same plant in different years. The greater proportion of proliferations develops in the first flowers that bloom.

"No proliferations have been found in any strains of *Hibiscus militaris* or *H. Moscheutos*, but they occur among the hybrids between the latter and *H. oculiroseus*.

"Numerous specimens and drawings were exhibited."

Dr. P. A. Rydberg and others took part in the discussion of this paper.

Dr. Britton exhibited a number of photographs taken on the island Kadiak, Alaska. These photographs were taken by Prof. W. T. Horne in 1902.

Adjournment followed.

B. O. DODGE,
*Secretary*

DECEMBER 11, 1917

The meeting was held at the American Museum of Natural History at 8:15 P.M. President Richards presided. There were 40 persons present. There was no business transacted at this meeting.

The scientific program consisted of a Symposium on "Vacant Lot and School Gardens." The first paper was presented by Mr. H. G. Parsons. The subject of his address was "Courses on Gardening at the New York Botanical Garden."

"In April, 1917, The Garden School was instituted at the New York Botanical Garden, Bronx Park, New York City, with the primary intention of giving instruction to persons who desire to conduct school gardens and home gardens. A garden was laid out in a charming spot adjacent to the Mansion, where the lecture and classrooms are, and the two are connected by a short woodland path overhung by dogwoods and bordered by native wild-flowers. The garden is on the shore of a beautiful woodland lake, and the classrooms look down upon the historic Bronx River, near the Falls and the old Snuff Mill. Instruction for school-garden training was given in courses of six weeks daily for three hours, with lecture, shop, and garden periods, and a certificate was given for the successful completion of the work. Instruction for home gardens was more elastic, the effort being made to meet the needs of earnest students with limited spare time. For these there have been lectures and garden practice, usually in weekly sessions. The Saturday morning classes being favored by teachers. During the winter the greenhouses are used for instruction. One of the special features is a small home garden (an hour-a-day garden) on which was grown an assortment of vegetables for a family of four, with a gross money value of $50. What we desire to do is to guide beginners along lines of instruction which will enable them to find in their gardens rest and recreation for mind and body; food for the soul as well as for the palate; a source of inspiration that will make us all philosophers, artists and poets and increase our capacity to enjoy the delights of the world we live in.

"The lecture was illustrated by lantern-slides showing garden activities and students at work."

Miss Jean A. Cross read a paper on "What the Brooklyn Botanic Garden is doing for Brooklyn." An abstract of this paper follows.

"At the Brooklyn Botanic Garden the work in elementary instruction is in three divisions, viz., children's class work, coöperation with schools, and instruction for garden teachers.

"*Children's Class Work.*—During the outdoor growing season 290 children had plots 8 x 10 feet. The crop for two days, when records were kept, averaged $173.52. There were 60 plots 10 x 20 feet for older children and teachers, besides 16 plots 20 x 40 feet. During the winter and early spring we have greenhouse classes; at present 130 children are enrolled. Fifty of these are high-school students.

"*Coöperation with Schools.*—Early in the spring 115,847 penny packets of seeds were sold to school children, representing a steady increase from 25,000 packets in 1914. Home visiting was done in various sections of the city. In September our fourth annual children's horticultural exhibit was held, the children bringing in produce from their home gardens. Student teachers from the Brooklyn Botanic Garden supervised these school gardens.

"During six weeks in the spring and fall, 155 classes from schools visited the garden in school hours for a lecture, observation in the economic house, and a visit to the Japanese Garden. Gary schools and high schools send classes weekly for greenhouse work. Eighty-three lectures were also given by members of the Brooklyn Botanic Garden staff at schools. The attendance was 27,605.

"*Instruction for Teachers.*—Theory and practical work in the greenhouse and children's garden. A year's course is offered, also a condensed six weeks' summer course. Certificates in

Children's Gardening are conferred upon the satisfactory completion of this course. Twenty-two certificates were conferred in December, 1917."

The next paper was read by Miss Hester M. Rusk, the subject of her address being "The Woman's Agricultural Camp at Bedford, N. Y." Miss Rusk gave an account of her experience as a farm laborer at this camp. Among the topics discussed were: the nature of the work done by the woman laborer, the system of employment, the attitude of the employers, the attitude of the people of the community, the attitude of the other employees, the general effect on the health of the women employed. Discussion of the paper followed. Miss Delia Marble spoke in high praise of the character of the work done by these women, stating that the employers as a whole looked upon the enterprise with considerable favor.

Mr. Carl Bannwart followed with a paper on "Vacant Lot Gardening in Newark, N. J." His lecture was illustrated with charts showing the number of acres of vacant land within the city suitable for gardening and the number of acres actually under cultivation in 1915, 1916 and 1917. There were approximately 550 acres of land suitable for gardening, of which 10 acres were cultivated in 1915, 22 acres in 1916, and 193 acres in 1917. The produced crop values were $4,200 in 1915, $10,600 in 1916, and $144,572.88 in 1917. The diagrams shown and summary of the facts presented in this lecture were published in the Newark Evening News, Wednesday, December 12, 1917.

A general discussion of the papers given during the evening followed.

Meeting adjourned.

B. O. Dodge,
*Secretary*

# The Torrey Botanical Club

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their papers appear, will kindly notify the editor when returning proof.

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# OTHER PUBLICATIONS

OF THE

# TORREY BOTANICAL CLUB

## (1) BULLETIN

A monthly journal devoted to general botany, established 1870. Vol. 44 published in 1917, contained 579 pages of text and 26 full-page plates. Price $4.00 per annum. For Europe, 18 shillings. Dulau & Co., 47 Soho Square, London, are, agents for England.

Of former volumes, only 24–44 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–44 three dollars each.

Single copies (30 cents) will be furnished only when not breaking complete volumes.

## (2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–15 are now completed; No. 1 of Vol. 16 has been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

DR. BERNARD O. DODGE

Columbia University

New York City

Vol. 18 April, 1918 No. 4

# TORREYA

A Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873.

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# THE TORREY BOTANICAL CLUB



OFFICIAL ORGAN OF THE WILD FLOWER PRESERVATION SOCIETY OF AMERICA

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NORMAN TAYLOR
Brooklyn Botanic Garden
Brooklyn, N. Y

# TORREYA

April, 1918

Vol. 18 No. 4


## PRESERVING OUR WILD FLOWERS

By Albert A. Hansen

Early in the fall of 1916, the Pennsylvania state chapter of The Wild Flower Preservation Society of America was organized with a charter membership of twenty. Following the precedent established by other chapters of the national organization, a single officer only was elected, the secretary, who likewise acted as the executive head of the local chapter.

It is felt that a résumé of the work accomplished during the first year of its existence will be of interest and perhaps act as the inspiration for the establishment of similar local organizations. The chapter was organized under the auspices of the botanical department of the Pennsylvania State College. Because of its location in a college community, the opportunities presented for useful work were numerous. A prevalent custom among the students was to decorate the fraternity houses during house parties, receptions, etc., with mountain laurel, rhododendron and other evergreen foliage. Since their social events were sufficiently numerous to prove a serious drain upon the wild flora, a request was sent to each of the fraternity houses, asking that this custom be discontinued. The request was met in a cordial manner with the result that the practice was cut down to the minimum and a large number of such slow-growing evergreens as the mountain laurel and rhododendron were saved for the enjoyment of the students of the future. In addition many citizens of the town, who had previously never given the subject serious thought, refrained from utilizing the desirable wild vegetation for decorative purposes, substituting in its place when

[No. 3, Vol. 18 of Torreya, comprising pp. 41–64 was issued 10 April, 1918.]

possible such weedy but handsome plants as the numerous goldenrod, asters, etc., thereby contributing their mite toward aiding the farmer with his weed problem.

Another practice, now practically discontinued as a result of the efforts of the society, was the custom of using ground-pine, *Lycopodium* sp., pipsissewa, *Chimaphila umbellata*, and spotted wintergreen, *Chimaphila maculata*, at receptions, teas and other social functions for the purpose of pinning specimens of the plants on the guests. This custom led to a serious depletion of the spotted wintergreen in the college woods until the species became almost extinct in the vicinity. It is now sincerely hoped that the erstwhile abundant flora of these plants will be speedily replenished by natural means.

The immediate vicinity of the college was, until about ten years ago, well stocked with wild growth of arbutus; the supply was so plentiful that one needed but tramp for a few minutes from the main building in order to obtain an abundant supply. Due to the foolish custom of pulling out the long, creeping stems of the plant, arbutus soon disappeared from the vicinity, until it is necessary now for the students to tramp several miles in order to obtain a sufficient supply for tokens to mothers, sisters and sweethearts, in the spring of the year. The writer well remembers the profusion of arbutus which ornamented Shingleton Gap, a beautiful mountain pass, about three miles from the college, but a few years ago. The entire gap has been so stripped of the "*sweetest flower that grows*" that the plant is practically extinct, since a careful search failed to reveal a single specimen in the entire gap during the spring of 1917. The efforts of the society, by means of lectures, printed statements and chapel appeals, has attempted to educate the student body to pick the flowering stems only and thus allow the propagating stem to remain and so flower from year to year. Arbutus seeds in the vicinity of State College; although but few seeds are ordinarily matured, it is felt that sufficient flowers are overlooked to provide the necessary seed for reproduction purposes, since the late-blooming flowers are seldom picked. By the means just described it is hoped to save arbutus as a valuable heritage of nature for the pleasure and profit of the generations of the future.

A veritable treasureland of botanical wonders is Bear Mountain, a huge Sphagnum bog located in the mountains about sixteen miles from the college. Here may be found such botanical gems as the high-bush huckleberry or swamp blueberry, *Vaccinium corymbosum*, the dainty twayblade, *Listera cordata*, the almost extinct (in this region) American larch or tamarack, *Larix americana*, various species of handsome trilliums, and the absorbingly interesting insectivorus plants, the pitcher plant, *Sarracenia purpurea*, and the sundew, *Drosera rotundifolia*. The Meadows, as the place is popularly known, is a favorite objective of Sunday "hikes" and a popular rendezvous of nature-loving students, consequently the flora has suffered to a considerable extent. This is especially true of the pitcher plants, which are threatened with total extinction, since at the present writing only a few survivors remain of a formerly abundant flora. Following an exhibition last spring of pitcher plants brought in from Bear Meadows and placed in the window of a local merchant, parties were organized for the express purpose of hunting these interesting plant curiosities, and the lone survivors were placed in serious jeopardy. The chapter immediately launched a campaign for the protection of the pitcher plant, a campaign which it is hoped saved the plant from total extinction.

Another plant which has received the special attention of the society is the gorgeous pink lady's slipper, *Cypripedium acaule*, a species formerly abundant, but now rare because of thoughtless picking. Its relative, the handsome yellow lady's slipper, *Cypripedium parviflorum*, was until recent times a not uncommon member of the local flora; today it is absolutely extinct in the vicinity. It is hoped that the pink species will not meet with the regrettable fate of its unfortunate relative.

The efforts of the local chapter have been extended along many lines. During the first year of existence, over thirty lectures were given to various groups, including fraternities, Boy Scouts, Campfire Girls, the Woman's Club, the student body of the Bellefonte Academy, farmers' wives and various rural organizations. For this purpose a set of beautifully colored lantern-slides was used. The slides were collected from various sources, many of them having been purchased from the Stokes collection for the Protection of Our Native plants prepared at the New York Botanical Garden. Some of these slides were used during the early spring in an appeal for the protection of the flowers staged through the courtesy of the local moving-picture theater. This method proved an effective means of advertising the objects of the society. The pictures, with their accompanying appeal, were exhibited for an entire week, a change of slides being made daily. The local plants most urgently in need of protection were all thus brought to the attention of the citizens of the town.

The use of the press was not neglected in the work of the chapter. One thousand reprints of a previously published paper relating to the protection of the wild flora* were distributed among the newspapers and other periodicals of Pennsylvania. The appeal received country-wide circulation due to its recognition by the American Review of Reviews, which reviewed the article at length in the July number, 1916.

The influence exerted by the society may well be illustrated by an incident which occurred in the spring of 1917. While home during the Easter vacation, one of the students entered into a pact with a Philadelphia florist to supply annually 75,000 fern fronds as a means of securing money to pay the expenses of college. The fronds were to be collected in the mountains surrounding the college, with no regard for the future of these slow-growing plants. Learning of the work of the Wild Flower Society, the student consulted the organization before attempting this wholesale depredation on the beauty of the local flora. Needless to say, the contract with the florist was never filled. Had such an attempt been allowed, the ferns of the region would have been in grave danger of extermination before the graduation of the student, a shameless encroachment upon the rights of others. Though in this instance the removal of the ferns would no doubt have greatly benefited the individual student, the doctrine of the greatest good for the greatest number demanded in all fairness that the fern flora remain undisturbed for the enjoyment of the nature-lovers of the future. The Pennsylvania

* Our Disappearing Wild Flowers, by Albert A. Hansen, The Pennsylvania State Farmer, May, 1916.

State Chapter has always tried to foster the spirit that each generation has inherited a bountiful gift of nature, a gift which should be accepted in guardian spirit. We are the trustees of the world's resources, be they birds, animals, minerals or plants, and as trustees we should spend wisely and should not squander or waste; much less should we rob posterity of the blessings which we now enjoy.

The Pennsylvania State Chapter has many ambitious plans for the future, plans for the establishment of a prize-fund for flower-conservation essays in the high schools of Pennsylvania, the instituting of popular, non-technical botanical expeditions to study the rich mountain flora surrounding the college and various other useful projects. During the organization of the chapter the writer was elected to the office of secretary. His recent affiliation with the United States Department of Agriculture has placed the burden of the active work of the chapter on the willing shoulders of the professor of botany of the Pennsylvania State College, under whose able leadership the organization should prosper and flourish.

## List of Pennsylvania Plants Urgently in Need of Protection

All wild lilies, arbutus, bluebells (*Mertensia*), bird's-foot violet, bunchberry, bloodroot, blue-eyed grass, columbine, cardinal-flower, cowslip, cat-tail, clintonia, Dutchman's breeches, dog's-tooth violet, fringed gentian, flowering dogwood, fringed milk-wort, ground pines, hepatica, iris, jack-in-the-pulpit, mountain honeysuckle (*Azalea*), maiden-hair fern, mountain laurel, nanny-berry, painted cup, pink lady's slipper, pitcher plant, rhododendron, sweet bay, showy orchis, spring beauty, star flower, spice-bush, trillium, twayblade, various ferns, water lily, wild pink, wintergreen, wind flower (rue anemone), wood anemone, wild strawberry, winterberry, wild geranium (cranesbill), walking fern, yellow lady's slipper, yellow pond lily, yellow star grass, yellow fringed orchid.

# NOTE ON THE PLANTS OF WALLOP'S ISLAND, VIRGINIA

By W. L. McAtee

During a visit to Wallop's Island, off the eastern shore of the upper peninsula (Accomac County) of Virginia, from May 23 to June 2, 1913, the writer gathered as complete a collection of plants as possible. His intention was to prepare a report upon them that would fully illustrate the flora of the island at that season. After bringing the collection to Washington, however, and before more than a beginning had been made in identifying it, the whole lot was ruined by the terrific wind and rain storm of July 30, 1913, which smashed the windows of our offices and deluged the interior with more than two inches of rain.

There remained only notes upon the species that had previously been identified. Since it is not likely that the writer will have the opportunity of making another collection at this locality, and since some of the records have interest from the standpoint of geographical distribution, the fragmentary list is herewith presented.

Of all the plants observed on Wallop's Island, the writer will remember longest the yellow thistle (*Cirsium horridulum*). The plants were chiefly low rosettes, but vigorous and luxuriant in appearance, each framing a single very large flower head of a pale but beautiful yellow—to most observers an entirely unexpected hue for a thistle. Another point of interest in connection with this island is the presence of large stumps of *Chamaecyparis thyoides*, *in situ* on the outer beach—a bit of evidence such as is found at many points along the Atlantic coast of fairly recent and probably continuing submergence.

According to oral evidence there was a time, within the memory of men now of middle age, when Wallop's Island had no trees. The largest pine now present is about eighteen inches in diameter. This species of pine (*P. taeda*) is called sap or Virginia pine in this neighborhood, while *P. virginiana*, which grows on the mainland, is known as bastard, spruce or scrub pine. Another interesting local name heard here was kink's bushes for *Baccharis*.

List of Species

*Osmunda regalis*
*Dryopteris thelypteris*
*Lorinseria areolata*
*Pinus taeda*
*Chamaecyparis thyoides*
*Ruppia maritima*
*Agrostis hyemalis*
*Ammophila arenaria*
*Capriola dactylon*
*Poa pratensis*
*Festuca octoflora*
*Festuca myuros*
*Scirpus americanus*
*Carex straminea*
*Juncus dichotomus*
*Smilax rotundifolia*
*Iris versicolor*
*Sisyrinchium angustifolium*
*Myrica carolinensis*
*Rumex hastatulus*
*Hibiscus Moscheutos*
*Viola primufolia*
*Opuntia Opuntia*
*Raimannia humifusa*
*Asclepias incarnata*
*Convolvulus Sepium*
*Bignonia radicans*
*Plantago virginica*
*Rumex crispus*
*Polygonum prolificum*
*Persicaria hydropiperoides*
*Persicaria punctata*
*Salsola kali*
*Cerastium vulgatum*
*Sagina decumbens*
*Ranunculus sceleratus*
*Lepidium virginicum*
*Potentilla monspeliensis*
*Rubus cuneifolius*
*Crataegus crus-galli*
*Padus virginiana (serotina)*
*Trifolium dubium*
*Trifolium arvense*
*Linum usitatissimum*
*Toxicodendron radicans*
*Acer rubrum*
*Vitis labrusca*
*Parthenocissus quinquefolia*
*Cynthia virginica*
*Leontodon taraxacum*
*Ambrosia elatior*
*Solidago sempervirens*
*Baccharis halimifolia*
*Antennaria plantaginifolia*
*Senecio tomentosus*
*Cirsium horridulum*

## NOTES ON SOUTHERN WOODY PLANTS

By W. W. Ashe

**Vaccinium Margarettae** sp. nov. A shrub forming large patches by means of underground stems; branches 4–6 dm. high, the numerous short spreading or nearly horizontal branchlets crowded at their summits. Season's twig soft pubescent, glabrous the second year. Leaves deciduous, oblong or narrowly oblong, rarely obovate, obtuse or acute at each end, 2 to 3.5 cm. long, 0.7 to 1.8 cm. wide, grayish green as they unfold, dark green when mature, turning dark crimson after frost, permanently soft gray pubescent beneath, entire, apiculate, sessile or nearly so. Racemes, axillary or terminating the short branchlets, 1 to 2.5 cm. long, 4- to 7-flowered, pubescent. Flowers appearing the last week in April or early in May, when the leaves are about one half grown, cylindrous, 7–8 mm. long, pale greenish-yellow, striped especially in the bud with red, nodding on short pedicels; calyx lobes short, turning red after corolla falls. Fruit black and shining, about 6 mm. thick, ripens in July after that of *V. vacillans* Sol. Flowers appear 10 days after those of *V. vacillans*, with which it grows in rosemary, pine, and mixed oak woodland at altitudes of 450–600 m. in the mountains of Georgia and South Carolina where locally abundant. W. W. A., Oconee Co., S. C., May, 1912; Rabun Co., Ga., July, 1912; May 10, 1917; October 1, 1917. Representative specimens are deposited in U. S. National Herbarium; Field Columbian Museum; Charleston, S. C., Museum; Pittsburgh Museum; and Herbarium of Columbia University.

I have recently (Bul. Charl. Mus. 13:26, April, 1917) noted noted that the name *Quercus pagoda* Raf.* should replace that of *Q. pagodaefolia* (Ell.) Ashe.† A change also seems necessary in the case of the combination *Quercus hybrida* which I lately discussed (Proc. Soc. Am. For. 11, 1, 89, 1916) as referring to the oak described by Michaux (Ch. 10, pl. 18, 1801) in case this form is held as of specific rank, which in my opinion it should be. The correct name of this tree appears to be:

**Quercus obtusa** (Willd.) n. comb.

The synonymy is as follows:

*Q. laurifolia hybrida* Mx. Ch. 10, pl. 18 (1801), not *Q. hybrida* Houba Chên. L' Am. Sept. 200 t. (1887).

*Q. laurifolia B. obtusa* Willd. Sp. Pl. 4, p. 1, 428 (1809).

* Alsogr. Am. 23 (1838).

† N. C. Handbook (1896).

*Q. aquatica* γ *elongata* Ait. Hort. Kew. Ed. 2, 5, 290 (1813), not *Q. elongata* Willd. Nov. Act. Soc. Scrut. Borol. 3: 400. 1801.

*Q. laurina* Raf. Als. Am. (1838), not *Q. laurina* Humb. & Bonp. Pl. Aeq. 2, 32 (1809).

It is doubtful whether Aiton's *Q. aquatica* γ *elongata* should be included in this synonomy since the plate to which he refers (Ab. Ins. Ga. tab. 59) clearly represents a not unusual form of of *Q. nigra* individual trees of which occasionally bear, sometimes exclusively, such foliage in place of the usual spatulate 3-lobed form. Bartram's *Q. hemispherica* is undoubtedly this tree (see Elliott, Sk. 2, 596), but he distinguishes it (Tr. pp. 318, 392, 472, Ed. 1792) from *Q. nigra* (*aquatica*) and from *Q. phellos* as well as from *Q. laurifolia* (to which he refers as *Q. dentata* "narrow leaved winter green oak"). He seems to have been the first to separate these forms from *Q. nigra.* Michaux (Chênes 11) incorrectly refers Bartram's *Q. dentata* and *Q. hemispherica* to forms of *Q. nigra*, notwithstanding that he gives (t. 20, fig. 2) a good figure of *dentata* even showing the clustered buds and lanceolate leaves, broadest when entire (as they are on the slower growing wood) at or near the middle.

This tree is undoubtedly closely related to *Q. laurifolia* as generally understood, but it can be readily separated from it by the leaves of vigorous shoots, which in *Q. laurifolia* are irregularly toothed, while in *Q. obtusa* the margins are entire. The cup also has a very pointed base, while the base of the cup in *Q. laurifolia* is flat. It occurs and is not uncommon along the edges of and in the drier portions of hardwood swamps from southeastern Virginia near McKenney, Dinwiddie Co., southward, being found in the southern part of North Carolina 60 miles inland along the Lumber River in Robeson County. Under the name water oak it is generally planted in coastal towns, as in New Berne and Wilmingon, N. C., as a shade tree. *Q. laurifolia* in this section is restricted to the immediate vicinity of the coast and is so strikingly different from *Q. obtusa* oak as to be separated in places by local names.

**Quercus leucophylla** n. comb., *Q. rubra leucophylla* Ashe (Bul.

Charl. Mus. l. c.). A more careful consideration of this form seems to indicate that its very deeply sinuate sun leaves, the difference in form between the shade and sun leaves and the larger fruit and loose white-oak-like bark are characters which are sufficiently strongly marked and of a constancy to entitle it to specific rank.

**Carya ovalis megacarpa** n. comb. (*C. megacarpa* Sarg. T. & S. 2, 201). An examination of material of *Carya megacarpa* Sarg. from the type locality, Rochester, Monroe County, N. Y., shows that this tree exhibits close affinity to *C. ovalis* (Wang.) Sarg. by having the lower surface of the 5 to 7 leaflets dotted with resinous globules, by having thick, glabrous, red-brown twigs, and short (though larger) ovate and obtuse buds. The only distinguishing characters seem to be in the fruit and buds. The fruit of *C. ovalis* is extremely variable, Dr. Sargent having distinguished four forms, of which the variety *obovatis* approaches *C. megacarpa*. The buds also vary, becoming smaller and inseparable from those of *C. ovalis*, and in a form from the coastal plain of Georgia, a specimen of which has been examined by Dr. Sargent and referred to *C. megacarpa*, both buds and twigs are as slender as in *C. porcina* (Mx.) Nutt.

## REVIEWS

### Ward & Whipple's Fresh-Water Biology*

This monumental work, to which Professor Ward in particular has devoted many years of investigation as well as editorial supervision over the writings of the other 25 collaborators, is the first attempt of its kind to cover North American fresh-water life in its entirety.

With few exceptions, the various groups of organisms found in fresh waters are treated quite exhaustively, both in their systematic relations as well as in the general details of their anatomy, life history, and biological relations. For the most part, each genus of the various groups is illustrated; while ingenious keys

* Henry Baldwin Ward and George Chandler Whipple, Fresh Water Biology. Pp. ix + 1111. 1,547 figures. New York, John Wiley & Sons, 1918. Price $6.00.

readily carry the reader, in some places even to species, in others only to genera.

In the discussion of the fishes and other aquatic vertebrates by Professor Eigenmann, as well as in the chapter on bacteria in fresh waters by Professor Jordan, it was obviously impossible within the limited space to treat of these organisms except in the briefest way, along general biological lines.

One hundred and ten of the pages are utilized in the strictly botanical portion of the book, the larger aquatic vegetation being treated of from a physical-chemical viewpoint by the late Professor Pond; the green algae by Professor Julia Warner Snow, and the blue-greens by the reviewer. One thousand pages of treatment of animal forms should also prove of utmost interest and importance to all students of the organisms occurring in waters, including the technical water engineer as well as the botanist and zoölogist seeking further information about aquatic life. The distinguished list of specialists who collaborate in the handling of the more zoölogical aspects of the subject insure a most adequate and interesting treatment of their portions of the book. Professors Ward and Whipple deserve the thanks of all biologists for their part in the making of this most stimulating and timely book.

E. W. Olive

## PROCEEDINGS OF THE CLUB

### January 8, 1918

The annual meeting was held at the American Museum of Natural History. President Richards called the meeting to order at 8:15 P.M. There were fourteen persons present.

The minutes of the meetings held November 28 and December 11 were approved.

The following persons were nominated for membership: Dr. John Ernest Weaver, University of Nebraska, Lincoln, Nebraska; Prof. E. T. Harper, Geneseo, Ill.; Mr. Rudolph Konnerth, College of Pharmacy, New York City; Dr. J. J. Davis, University of Wisconsin, Madison, Wis.

Mr. Percy Wilson, chairman of the Field Committee, reported that there were thirty-two field meetings scheduled for the year 1917. The attendance was 417. The meeting held July 21 at Fort Lee, N. J., was attended by 29 persons. Six other meetings were held at which 20 or more persons were present. The report was adopted and placed on file.

Prof. R. A. Harper, chairman of the Committee on Abstract Journal for botanical papers, appointed to represent the Torrey Club at Pittsburgh, reported on the activities of the joint committee at the meetings held at that place.

President Richards reviewed the work of the Club during the year and suggested that the same policies should be continued during the coming year.

The report of the editor, Dr. A. W. Evans, was read and ordered placed on file. Dr. M. A. Howe, delegate to the council of the New York Academy of Sciences, submitted a report which was accepted.

The Secretary's report was read and adopted. There were fourteen regular meetings held during the year; 363 persons attended these meetings. Six lectures illustrated by lantern slides were given, at which the combined attendance was 226. The celebration of the fiftieth anniversary of the Club was held October 18, 19, 20. A full report of these meetings will be published by Dr. M. A. Howe in the memorial volume.

The Treasurer's report was read and referred to an auditing committee consisting of Dr. J. H. Barnhart and Dr. M. A. Howe.

The election of Dr. Weaver, Prof. Harper, Dr. Davis and Mr. Konnerth, nominated earlier in the meeting, followed.

The resignations of Prof. O. S. Morgan and Dr. W. Mendelson were read and accepted.

The resignation of Prof. S. M. Tracy was accepted and his name was transferred to the list of corresponding members.

The election of officers resulted as follows:

*President*, H. M. Richards.

*Vice-Presidents*, J. H. Barnhart,
C. S. Gager.

*Secretary-Treasurer*, B. O. Dodge.

*Editor*, A. W. Evans.

*Associate Editors*, Jean Broadhurst,
J. A. Harris,
M. A. Howe,
M. Levine,
A. B. Stout,
W. Marquette,
Norman Taylor.

*Delegate to the Council of the New York Academy of Sciences*, M. A. Howe.

Adjournment followed.

B. O. Dodge,
*Secretary*

JANUARY 30, 1918

The meeting was held in the morphological laboratory of the New York Botanical Garden at 3:30 P.M. Vice-President Barnhart presided. There were twenty persons present.

The minutes of the annual meeting held January 8 were read and approved.

Dr. Barnhart, chairman of the Auditing Committee, reported that the committee had examined the books of the treasurer and found them to be correct.

The report of the Budget Committee, read by Dr. M. A. Howe, the committee's secretary, was adopted. The committee reported as follows:

"The Budget Committee of the Torrey Botanical Club met at the Museum of the Torrey Botanical Garden at 2:30 P.M. January 30, 1918. Present, Drs. Barnhart (chairman), Britton, Dodge, Evans, Howe and Rusby.

| "*Estimated Income* | | "*Estimated Outgo* | |
|---|---|---|---|
| "Regular membership dues | $1,000 | "Bulletin | $1,400 |
| Sustaining members | 115 | Memoirs | 1,300 |
| Bulletin | 750 | TORREYA | 525 |
| Advertisements | 40 | Index Cards | 200 |
| Memoirs | 300 | Secretary-Treasurer | 300 |
| TORREYA | 125 | Sundries | 100 |
| Index Cards | 200 | Arrearages for printing | 1,000 |
| Interest | 85 | | |
| Semi-centennial fund | 2,100 | | |
| Sundries | 125 | | |
| Total | $4,840 | Total | $4,825 |
| | | Estimated balance | 15 |
| | | Total | $4,840 |

"It was voted that the Semi-Centennial volume of the Memoirs (Vol. XVII) be issued in an edition of 500 copies and that the subscription price of this volume be fixed at $5.00.

MARSHALL A. HOWE,
*Secretary*."

Mrs. Britton, chairman of the Program Committee, reported that the Committee had arranged for a lecture by Professor H. H. Rusby on his trip to Columbia, S. A.

The resignation of Dr. F. D. Fromme was read and accepted.

A scientific program was then carried out. Mrs. E. G. Britton reported briefly on "*Jägerinopsis*, a Tropical Genus new to the United States and Cuba."

Prof. R. A. Harper, chairman of the committee representing the Torrey Club at the meetings of the Committee on Botanical Abstract Journal, at Pittsburgh, reported on the work to be done by botanists to further the conservation and protection of food crops. This subject had been discussed at length at the meetings of the A. A. A. S.

Dr. E. W. Olive reported on papers read at the Pittsburgh meeting. "Owing to the short time, only a few general observations were made concerning the meetings at Pittsburgh. The large and enthusiastic meeting of collaborators of the Plant Disease Survey of the U. S. Dept. of Agric. was spoken of, as well as Dr. Lyman's stimulating participation in the various lines of war activities there suggested, looking toward the control of plant diseases. A few papers which were read before the American Phytopathological Society were also briefly reviewed and a few comments were made on a new botanical abstract journal."

Dr. A. B. Stout followed with additional remarks on the Pittsburgh meetings which he attended.

Dr. J. H. Barnhart spoke on the actions taken at Pittsburgh relative to the establishment of a botanical abstract journal. On the motion of Mrs. Britton the Club voted to endorse the general movement for crop protection in accordance with the action taken at Pittsburgh. It was then voted to appoint a committee with power to represent the Club in accordance with the preceding motion. Dr. E. W. Olive was elected chairman of this committee and the president was authorized to appoint other members of the committee upon the recommendation of the chairman. Adjournment followed.

B. O. Dodge,
*Secretary*

## NEWS ITEMS

Owing to the coal shortage Conservatory Range No. 2 at the New York Botanical Garden was cleared in December, the plants all being housed in the old conservatory range. On January 10 the Brooklyn Botanic Garden reduced by 375 linear feet its greenhouse space, thus crowding the collections in fewer houses. and necessitating the closing of the conservatories to the public,

On January 10 the second issue of the *Journal* of the International Garden Club was published. Hereafter the publication will be issued quarterly in March, June, September and December, the March issue appearing on the twentieth.

The British government has ordered one hundred thousand kapok waistcoats for its sailors. This "vegetable wool," derived from *Bombax malabaricum*, has been suggested as desirable also for our own sailors.

# The Torrey Botanical Club

Contributors of accepted articles and reviews who wish six gratuitous copies of the number of TORREYA in which their papers appear, will kindly notify the editor when returning proof.

Reprints should be ordered, when galley proof is returned to the editor. The New Era Printing Co., 41 North Queen Street, Lancaster, Pa., have furnished the following rates:

| | 2pp | 4pp | 8pp | 12pp | 16pp | 20pp |
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| 25 copies | $ .79 | $1.14 | $1.78 | $2.32 | $2.87 | $3.28 |
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**Covers: 25 for $1.00, additional covers 1¼ cents each.**

**Plates for reprints, 50 cents each per 100.**

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The following committees have been appointed for 1918:

**Finance Committee**

R. A. HARPER, *Chairman.*
J. H. BARNHART,
MISS C. C. HAYNES
SERENO STETSON

**Budget Committee**

J. H. BARNHART, *Chairman.*
R. A. HARPER
N. L. BRITTON
A. W. EVANS
M. A. HOWE
H. H. RUSBY

**Field Committee**

PERCY WILSON, *Chairman.*
MRS. L. M. KEELER
MICHAEL LEVINE
WILLIAM MANSFIELD
GEORGE T. HASTINGS

**Program Committee**

MRS. E. G. BRITTON, *Chairman.*
PROF. JEAN BROADHURST
B. O. DODGE
T. E. HAZEN
F. J. SEAVER

**Membership Committee**

J. K. SMALL, *Chairman.*
MICHAEL LEVINE
E. W. OLIVE

**Local Flora Committee**

N. L. BRITTON, *Chairman.*

| Phanerogams: | Cryptogams: |
|---|---|
| E. P. BICKNELL | MRS. E. G. BRITTON |
| N. L. BRITTON | T. E. HAZEN |
| C. C. CURTIS | M. A. HOWE |
| K. K. MACKENZIE | MICHAEL LEVINE |
| NORMAN TAYLOR | W. A. MURRILL |

**Chairmen of Special Committees on Local Flora**

Ferns and Fern Allies: R. C. Benedict.
Mosses: Mrs. E. G. Britton
Liverworts: A. W. Evans
Fresh Water Algae: T. E. Hazen
Marine Algae: M. A. Howe
Gasteromycetes: G. C. Fisher
Hymenomycetes: W. A. Murrill
Except Russula and Lactarius: Miss G. Burlingham
Cortinarius: R. A. Harper
Polyporeae: M. Levine
Exobasidii: H. M. Richards
Rusts and Smuts: E. W. Olive
Discomycetes: B. O. Dodge
Lichens: W. C. Barbour
Sphaeriaceae, Dothideaceae: H. M. Richards
Hypocreaceae, Perisporieae, Plectascineae, Tuberineae: F. J. Seaver
Fungi-forming sclerotia: A. B. Stout
Imperfecti: H. M. Richards, F. Seaver, Mel T. Cook
Oomycetes: C. A. King
Zygomycetes: A. F. Blakeslee
Chytridiaceae,
Myxomycetes: Mrs. H. M. Richards
Yeast and Bacteria: Prof. J. Broadhurst
Insect galls: Mel T. Cook

# OTHER PUBLICATIONS

OF THE

# TORREY BOTANICAL CLUB

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## (1) BULLETIN

A monthly journal devoted to general botany, established 1870. Vol. 44 published in 1917, contained 579 pages of text and 26 full-page plates. Price $4.00 per annum. For Europe, 18 shillings. Dulau & Co., 47 Soho Square, London, are, agents for England.

Of former volumes, only 24–44 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–44 three dollars each.

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# TORREYA

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EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873.

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# TORREYA

May, 1918

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## THE LOCAL DISTRIBUTION OF INTRODUCED SPECIES NEAR DOUGLAS LAKE, MICHIGAN*


By Henry Allan Gleason


During the summer of 1914 Gleason and McFarland made a study of the local distribution of introduced species of phanerogams in the vicinity of the biological station of the University of Michigan.† It was then shown that less than half of the introduced species had succeeded in establishing themselves in the uncultivated region in the vicinity of the biological station and that their number steadily decreased with increasing distance from civilization; that these introduced species were in many cases dependent upon human aid for their dispersal; and that they were unable to compete successfully with the native vegetation.

During the summer of 1917 these observations were continued and in part repeated, in many instances in precisely the same localities. The general conclusions of the earlier paper, as stated above, are fully confirmed, while successive study of the same area after a three-year interval has given opportunity to show the present course of development in the introduced vegetation and among the introduced species.

### I. The Introduced Flora of Summer Resorts

The reduction in the number of introduced species with increasing distance from agriculture or permanent residences is

* Publication no. 171 from the Botanical Department of the University of Michigan.

† H. A. Gleason and F. T. McFarland, The introduced vegetation in the vicinity of Douglas Lake, Michigan. Bull. Torr. Club 41: 511–521. 1914.


[No. 4, Vol. 18 of Torreya, comprising pp. 65–80, was issued 8 May, 1918.]

still apparent. On the north shore of Douglas Lake, three long-established summer-resort colonies, separated by half-mile intervals, showed in 1914 a reduction in number of species from 42 to 26 and 1. These proportions are still maintained, although with some changes, in the species represented. On the same shore of the lake, half a mile farther from permanent residences, a cottage was built in 1916. Although the forest has been cleared around it, affording better conditions for ecesis, its introduced flora is still limited to the single species *Poa compressa.*

The same feature is again illustrated around Bryant's resort on the south shore of the lake. At the small hotel, where all wagon traffic ends, 19 species occurred in 1914 and 29 in 1917, Of the older flora, *Polygonum persicaria, Chenopodium hybridum, Amaranthus retroflexus,* and *Anthemis cotula* have disappeared, and 14 new species have appeared. These are *Ambrosia artemisiifolia, Brassica alba, Capsella bursa-pastoris, Cerastium vulgatum, Chrysanthemum Leucanthemum, Galeopsis Tetrahit, Lychnis alba, Polygonum erectum, Rumex obtusifolius, Sedum acre, Sisymbrium altissimum Trifolium repens, Verbascum Thapsus,* and *Veronica arvensis.* Of these new arrivals, *Capsella, Cerastium, Verbascum,* and *Trifolium* occurred in 1914 around cottages near the hotel and only a minor extension of range has been required. At the same time *Chrysanthemum* and *Sisymbrium* occurred along the main road leading to the hotel and less than a mile away. There still remain eight species which did not occur in the vicinity in 1914, and which have since effected a considerable migration.

In the dooryards of the cottages adjacent to the hotel, 16 species now occur where 13 were living in 1914. *Chenopodium album, Trifolium hybridum,* and *Verbascum Thapsus* of the older list have disappeared, while *Capsella Bursa-pastoris, Dactylis glomerata, Poa annua, Polygonum aviculare, Sisymbrium altissimum,* and *Trifolium pratense* have appeared. *Dactylis glomerata* did not occur in the vicinity in 1914; all the others were found in the immediate vicinity or along the main road leading to this summer resort.

Around the three cottages farthest from the hotel, 7 species occurred in 1914 and 13 in 1917. None of the earlier list has disappeared, and 6 have immigrated in three years. These are *Arenaria serpyllifolia*, *Dactylis glomerata*, *Phleum pratense*, *Lepidium virginicum*, *Rumex acetosella*, and *Trifolium repens*. *Arenaria* is the only one of these which does not occur elsewhere in the immediate vicinity.

In the small dooryard of an abandoned Indian hut, where 15 species occurred in 1914, the number has been reduced to 9. No new species has been added, while *Achillea millefolium*, *Chenopodium album*, *Dianthus barbatus*, *Lepidium virginicum*, *Rumex acetosella* and *Trifolium pratense* have disappeared.

On the grounds of the biological station 21 species were reported in 1914, while only 13 occurred in 1917. This involves no new additions, but the loss of eight species: *Avena sativa*, *Brassica arvensis*, *Polygonum Convolvulus*, *Secale cereale*, *Setaria viridis*, *Silene noctiflora*, *Trifolium pratense*, and *Verbascum Thapsus*.

The greatest change in the flora was observed in an isolated clearing in a cedar swamp, occupied by an old man throughout the year, and by one family during the summer months only. Nine of the 24 species listed there in 1914 have disappeared, while 17 species have immigrated. In 1914, 5 of the species were not known elsewhere in the uncultivated region; these have all disappeared. Of the new immigrants, *Melilotus alba*, *Polygonum pennsylvanicum*, and *Satureja acinos* are not now reported from any other stations within the area.

All of these several stations show as before the close dependence of introduced species on human activities. They also indicate a considerable fluctuation in the flora from year to year, involving the loss of some and the addition of other species. In general, the additions are greater than the losses, showing the cumulative effect of intercourse with the villages and agricultural districts on both sides.

A number of causes might be mentioned as possibly contributing to the loss of species, such as hoeing, mowing, or grazing at critical periods in the development of the plants, unfavorable climate, or competition with other species. Continuous observation throughout the season would be necessary to verify any of these. It is also impossible to describe the exact means of immigration, except in a few special cases, to be mentioned later.

## II. The Introduced Flora of the Aspens

In the uncultivated aspen region, covering some ten square miles on the south side of Douglas Lake and not interrupted by farms, the introduced species still occur chiefly along the roadsides. Quantitative studies similar to those of 1914 were made again in 1917, and the quadrats were located not only in the same general region, but almost precisely in the same position. In each of one hundred locations along the state road a strip of 2-meter quadrats was observed, beginning at the wheel track and extending at right angles to the road into the aspens until two successive quadrats without introduced species were reached. In the table, the figures of the first column indicate the number of first quadrats (*i. e.*, adjacent to the wheel track) in which the species was observed, those of the second column the number of second quadrats, and so on.

The close dependence of the introduced species upon the immediate proximity of the roadside is still clearly shown. Nevertheless, the species have extended into the aspens conspicuously

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Poa pratensis* | 76 | 37 | 29 | 22 | 20 | 14 | 10 | 6 | 3 | 3 | 3 | 3 | 4 | 2 | 1 | 1 | 1 |
| *Poa compressa* | 57 | 36 | 28 | 20 | 19 | 7 | 6 | 4 | 2 | 2 | 1 | 2 | 3 | 1 | | | |
| *Agrostis alba* | 42 | 5 | 1 | 2 | 6 | 4 | 3 | 3 | 1 | 1 | | 1 | | | | | |
| *Phleum pratense* | 26 | 6 | 3 | 1 | 1 | | | 1 | | | | | | | | | |
| *Trifolium pratense* | 23 | 6 | 2 | | 1 | 1 | 1 | | 1 | | | | | | | | |
| *Trifolium repens* | 17 | 3 | 1 | 1 | 3 | | 1 | 1 | | | | | | | | | |
| *Trifolium hybridum* | 9 | 2 | 1 | 1 | | | | | | | | | | | | | |
| *Rumex acetosella* | 3 | 7 | 7 | 8 | 10 | 6 | 6 | 5 | 4 | 3 | 1 | 1 | 2 | 1 | | | |
| *Lepidium virginicum* | 4 | 4 | 3 | 2 | | 1 | 1 | 1 | | | | | | | | | |
| *Verbascum Thapsus* | | 2 | | 2 | 1 | 2 | | | | | | | | | | | |
| *Achillea millefolium* | 2 | | | 1 | | | | | | | | | | | | | |
| *Agropyron repens* | | | | | 1 | 1 | 1 | 1 | | | | | | | | | |
| *Dactylis glomerata* | 1 | | | | | | | | | | | | | | | | |
| *Erigeron strigosus* | | | | 1 | | | | | | | | | | | | | |
| Total | 260 | 108 | 75 | 61 | 62 | 36 | 29 | 22 | 11 | 9 | 5 | 7 | 9 | 4 | 1 | 1 | 1 |

beyond their 1914 limits. At that time none was found more than 20 meters (10 quadrats) from the roadway, while in 1917 they extended as far as the seventeenth quadrat, or 34 meters.

This extension of range seems to be due to actual migration of the species concerned, rather than to any space-variation in the local environmental conditions. Most of the introduced species are typically sun plants and never occur under the deep shade of the aspen thickets. The annual growth of the thickets therefore normally tends to reduce the opportunity for their development. Since the aspen seeds germinate poorly except under the peculiar conditions immediately following a fire, new thickets are seldom formed and wide treeless expanses of *Pteris aquilina* occur everywhere in the association. The presence of such treeless areas bears no relation to the penetration of introduced species, and such areas may occur adjacent to the roadside and yet be virtually devoid of all foreign plants.

Immigration of introduced species certainly takes place every year: ecesis only when and where local conditions are favorable. The spring and early summer of 1916 and 1917 were both unusually cool and rainy. Under such conditions the surface layers of sand keep moist for a longer time and afford a better opportunity for seed germination. The extension of range shown by the table may be accounted for by this climatic feature. Even at the present time the number of individuals in the further quadrats is small, while the great mass of plants occurs in the first quadrat, adjacent to the wheel track.

Although many of the species are perennial, their presence seems to be frequently due to repeated immigration, rather than to their own reproduction. Such hardy species as *Achillea millefolium* and *Chrysanthemum Leucanthemum* did not occur in 1917 in stations where they had bloomed in 1915, and their reappearance awaits the coincidence of favorable environmental conditions and new immigration.

### III. The Introduced Flora of Hardwood Clearings

There are still some small areas of beech-maple hardwoods being cut for lumber. All the supplies of hay and grain for the lumber camps are hauled in by team, so that there is an exceptionally favorable opportunity for the immigration of seeds of many foreign species. The chance of their germination and growth is also good, since the ground is covered with leaf mold and is more retentive of moisture than the sand of the aspen association. Nevertheless, the migration of the invaders is closely dependent on human agency, and with one exception the foreign species are not found away from the logging roads which ramify through the forest. This exception is *Hieracium aurantiacum*, which is unusually mobile and is occasionally found at some distance from a road.

Lumbering is in progress during the winter, and the following summer a considerable population of introduced species marks every roadside, and is especially luxuriant in and near the logging camp and stables. One tract of eighty acres, lumbered during the winter of 1914–15, showed 41 introduced species in August, 1915, together with 12 native species, characteristic of clearings and burns. By 1917, 16 of these had disappeared and 11 others had arrived, leaving an introduced flora of 36 species, as listed below. Species common to both years:

*Achillea millefolium*
*Agrostis alba*
*Brassica alba*
*Capsella bursa-pastoris*
*Cerastium vulgatum*
*Chenopodium album*
*Cirsium arvense*
*Cirsium lanceolatum*
*Cynoglossum officinale*
*Echinochloa Crus-galli*
*Lepidium virginicum*
*Lychnis alba*
*Nepeta Cataria*
*Phleum pratense*
*Plantago major*
*Poa annua*
*Poa compressa*
*Poa pratensis*
*Rumex acetosella*
*Rumex elongatus*
*Taraxacum officinale*
*Trifolium hybridum*
*Trifolium pratense*
*Trifolium repens*
*Verbascum thapsus*

Species occurring in 1915 only:

*Amaranthus graecizans*
*Amaranthus retroflexus*
*Ambrosia artemisiifolia*
*Anthemis cotula*
*Avena sativa*
*Hieracium aurantiacum*
*Polygonum Convolvulus*
*Polygonum Persicaria*
*Setaria glauca*
*Silene noctiflora*
*Sisymbrium officinale*
*Solanum nigrum*

*Lappula deflexa*
*Polygonum aviculare*
*Sonchus asper*
*Zea Mais*

Species occurring in 1917 only:

*Arctium minus*
*Arenaria serpyllifolia*
*Brassica juncea*
*Chrysanthemum Leucanthemum*
*Dactylis glomerata*
*Hordeum jubatum*
*Ranunculus acris*
*Sisymbrium altissimum*
*Veronica arvensis*
*Veronica peregrina*
*Vicia villosa*

Besides the change in the flora, still more striking developments were exhibited in the general appearance of the tract. In 1915 the introduced species occurred as numerous but scattered individuals only. In 1917 the premises of the camp and all the logging roads were occupied by a meadow, in which *Poa pratensis*, *Phleum pratense* and *Agrostis alba* were the dominant species, with merely scattered colonies of other species. There were numerous other individuals of introduced species along the walls of the houses, at the edge of sawdust piles, and on rubbish heaps, but the majority of foreign species were limited to a small number of individuals scattered widely through the grass.

It was indicated in the 1914 paper that introduced species are characteristic of the logging roads for several years after they have been abandoned. Their number is gradually reduced as the growth of shrubs and young trees excludes the full sunlight. But if the roads are used by farm wagons, thereby affording continual opportunities for fresh immigration, a foreign flora will occur even in deep shade of the second-growth forest.

## IV. Method of Immigration

In general, the immigration of all the introduced species depends upon some form of human activities. The exceptions are *Verbascum Thapsus*, *Lepidium virginicum*, and *Rumex acetosella*, which show some tendency to establish themselves among the aspens at a distance from the roadsides, and *Hieracium aurantiacum*, scattered colonies of which occur in moist ground.

Travel in the uncultivated region is light, and limited almost entirely to wagons. Dung from the horses is dropped along the roads and several species are known to germinate from undigested seeds. Among these are *Polygonum Convolvulus, Chenopodium album, Trifolium repens, T. pratense,* and *T. hybridum.* Doubtless other species are brought in by the same means. Numerous fishing parties visit the region from the farming land around it, carrying in the wagon bed hay or grain for the horses, and seeds are scattered all along the way. Mud containing seeds may adhere to tires or horses, and drop off later. Certainly various other means exist also, although they have not been seen in operation.

A new cook-house was built for the biological station in 1914, and its premises showed only native species in 1914. Two or three farm wagons stop daily with supplies, and through their agency seven introduced species have arrived in three years. These are *Agrostis alba, Capsella Bursa-pastoris, Lepidium virginicum, Phleum pratense, Poa pratensis, Rumex acetosella,* and *Taraxacum officinale.*

## V. Notes on Individual Species

During the first few years after the establishment of the biological station, *Lychnis alba* was by no means a common plant. It was not listed by Gates in 1911,* and was first noted by the writer in one locality in 1912. Since then it has spread rapidly and widely, and is now abundant along most country roads, except in the aspen region, in old logging camps and along logging roads, and in the few cultivated fields near the lake. So continued a migration over such diverse habitats leads to the conclusion that it is actually of recent appearance, rather than that it had been limited in the past because of unfavorable climatic conditions.

Just the reverse is true of *Lappula deflexa.* Noted by Gates in one station only in 1911, it appeared very commonly in the same region in 1914, while in 1917 it had almost completely disappeared. It was completely lacking in some fields where it had been one of the commonest weeds in 1914, and did not appear in

* F. C. Gates, The vegetation of the region in the vicinity of Douglas Lake, Cheboygan county, Michigan, 1911. 14th Rep. Mich. Acad. Sci. 3: 46–106. 1912.

any of the lists made by the writer for this paper. Since most of its former stations were in exactly the same condition in 1917 as in former years, one can only conclude that the peculiar climatic conditions of 1916 and 1917 are in large measure responsible for its disappearance.

Another similar case is that of *Verbascum Thapsus*. This plant was noted in 1914 as one of the three introduced species which were able to invade the aspen association successfully. In 1917 it was rare in the aspens, and in some particular stations where it had been unusually abundant only dead floweringstems remained. Its seeds are occasionally distributed by water. Seeds lodged in debris on the north shore of Douglas Lake produced flowering stems in 1914, and a number of rosettes were found in the vicinity in 1915. Of these apparently only one came to maturity in 1916. Its dead stem, with a few seeds still in the capsules, was standing in 1917, but no young plants had developed from it.

Two colonies of *Malva moschata* have been known in the vicinity for several years. One of these, along a roadside in clay soil, still persists, while the other, growing in sand, disappeared between 1915 and 1917.

The dispersal of *Sedum acre* is of some interest. It has escaped from cultivation freely along the streets and on the vacant lots of the village of Levering, five miles northwest of Douglas Lake. Its seeds are probably carried from there in mud on tires or on the feet of horses. At Ingliside horses are frequently cleaned or watered in the lake, and the seeds are carried east and established along the shore. One such colony has persisted since 1911, and another was established a mile farther on in 1916.

From a consideration of these few species, and of the general distribution of other foreign species in the region, one is impressed with the precarious existence which most of these plants lead. They appear or disappear, are common or rare, depending upon the chance of migration and upon the yearly fluctuations of climate, while the rapidity with which they migrate or increase in number must be related to the great seed production so characteristic of our introduced weeds.

# A NEW HYMENOPAPPUS FROM COLORADO

By Geo. E. Osterhout

**Hymenopappus polycephalus** sp. nov.

Perennial from a tap-root; stems one to several, 4–6 dm. high, tomentose, becoming glabrate, leafy at the base and less so to the middle, the stem having 6–8 leaves; much alternately branched, the branches beginning near the base; leaves 10–12 cm. long, pinnately or bipinnately parted into very narrowly linear and rather distant divisions, the upper smaller; inflorescence paniculate, the heads long peduncled and single at the ends of the branches; the bracts narrowly obovate, 5–6 mm. long, tomentose, somewhat thickened in the middle, with a rather broad scarious margin; flowers yellow, the throat of the corolla broadly campanulate, scarcely 1.5 mm. long, the reflexed lobes about a third as much, the tube of the corolla about as long as the throat, glandular, the pappus about half the length of the tube; the achenes narrowly obpyramidal 4 mm. long, long villous, but the pappus not covered by their villosity.

Another perennial, yellow-flowered, *Hymenopappus* has been described from Colorado, *H. cinereus* Rydb., but that is a smaller plant, with fewer heads of flowers, and is less leafy. Dr. Rydberg's description says: "Stem about 2 dm. high, branched, with 2–4 leaves." The close relationship of *Hymenopappus polycephalus*, however, is not with *H. cinereus* but with *H. tenuifolius* Pursh. It is as high and as leafy as *H. tenuifolius*, but the flowers are yellow, not dull white, and it is a perennial, not a biennial. The achenes are very similar to those of *H. tenuifolius*.

*H. polycephalus* is found on the foothills of the eastern side of the mountains of northern Colorado at an altitude of 6,000 to 7,500 feet. It is plentiful in the open country about Livermore, Larimer Co., Colo., and northward to Dale Creek, and on into Wyoming, I think. It blossoms from the last of June to early in September. I have collected it a number of times, and for a time thought it belonged with *H. tenuifolius*. The type specimens were collected in the vicinity of Livermore, Larimer Co., Colo., Aug. 10–11, 1917, No. 5680.

Windsor Colo.

## REVIEWS

### Rydberg's Flora of the Rocky Mountains*

It is remarkable that although all parts of the United States have been settled now for many years, and most of the states explored rather thoroughly, botanically, no flora of the whole country has ever been published, if we except the fragmentary works of such early writers as Michaux, Pursh, and Nuttall. Indeed, only two serious attempts at a United States flora have ever been initiated, that of Torrey and Gray, some eighty years ago, and the comparatively recent Synoptical Flora, begun by Dr. Gray—neither of these ever brought near completion. This lamentable lack has been partly compensated for by the numerous regional manuals and by a host of state floras, some of them descriptive. With the appearance of Dr. Rydberg's long-awaited Flora of the Rocky Mountains, the regions for which a more or less adequate published flora exists are so extended that only two states are left unprovided for—Nevada and Arizona.

Of the two floras of the Rocky Mountains previously published, the first, by Coulter, appeared in 1885, and has long been so out of date as to be useless. The second, by Coulter and Nelson, appeared in 1909; it is an admirable work, so far as Wyoming and the immediately adjacent regions are concerned, but it is less satisfactory for the more remote districts. The present work covers a much larger region than either of its predecessors, its area extending from Saskatchewan, western Nebraska, and Colorado to eastern British Columbia, Idaho, and Utah, and it will be found to cover satisfactorily eastern Washington and Oregon, as well as the mountains of northern New Mexico. Several states and provinces now for the first time have a descriptive flora available—Utah, Idaho, Saskatchewan, and Alberta.

* Flora of the Rocky Mountains and adjacent plains—Colorado, Utah, Wyoming, Idaho, Montana, Saskatchewan, Alberta, and neighboring parts of Nebraska, South Dakota, North Dakota, and British Columbia. By P. A. Rydberg, Ph.D., curator, New York Botanical Garden, pp. i–xii, 1–1110. New York, December, 1917. Published by the author.

Rydberg's Flora will well satisfy a botanical need that has become more acute in recent years with the rapid development of the montane states. Only those who have occasion to determine large collections of plants from this region, especially the marginal portions, where nomenclature and taxonomy have been a matter of accident rather than science, can fully appreciate its value. The Rocky Mountain area is a striking example of insularity in botanical work. Too often isolated individuals, actuated by the best of motives, but frequently without the assistance of adequate literature or herbaria, have carried forward their work independently of that done in other centers. Unwarranted importance has been assigned to geographic isolation as a factor in determining specific distribution, with the result that a given species has sometimes been described several times from separated localities. If this Flora were no more than a correlation of nomenclature it would still serve an invaluable purpose; but it is far more than a "nomenclator."

No botanist is so well qualified as Dr. Rydberg to prepare a manual of the Rocky Mountains. For twenty-five years the flora of this vast and varied region has been almost the sole subject of his study in herbarium and field. Although most of the work has been carried on at the New York Botanical Garden, all the larger herbaria and some of the smaller ones have been visited, and the author has obtained a field acquaintance with the plants through several seasons' botanizing in the most interesting regions. He has already published, besides numerous short systematic papers and a series dealing with phytogeography, two important works on Rocky Mountain botany, the Flora of Montana and the Yellowstone National Park (1900) and the Flora of Colorado (1906). The intimacy of his association with Rocky Mountain plants is indicated by the fact that in the present book almost a thousand species bear his name as author.

This latest manual is the first to give an adequate idea of the richness of the mountain flora. The species described number 5,897, distributed among 1,038 genera. The largest family, of course, is the Asteraceae, comprising 1,068 species, giving, with the Cichoriaceae and Ambrosiaceae, a total of 1,224 species of composites, certainly a remarkably high percentage (20 per cent). The other large families are the Fabaceae (473), Poaceae (451), and Brassicaceae (325). Many of the genera are notable for the number of their representatives, especially *Poa* (67), *Carex* (162), *Salix* (76), *Eriogonum* (122), *Draba* (50), *Arabis* (50), *Potentilla* (80), *Lupinus* (80), *Pentstemon* (97), *Castilleja* (61), *Aster* (86), *Erigeron* (101), *Artemisia* (71), *Senecio* (114), and *Cirsium* (58).

Dr. Rydberg's ideas concerning species and genera are well known to the botanical public, and while there are many who will not agree with him in regard to the limits of groups, especially genera, such differences of opinion will not detract from the general usefulness of the flora. Synonyms are cited freely to coördinate generic segregations as well as variations in usage under different codes of nomenclature. If a botanical work is fairly and accurately written, the code of nomenclature followed and the measure of specific and generic limits adopted are matters of minor importance; and there is no doubt that the present work has been so prepared. Of special importance, too, is the fact that the descriptions have not been compiled but are drawn direct from the plants themselves.

The plan of the flora is excellent and in some respects superior to that of any similar American work. There are full keys to the families, genera, and species. The generic and specific descriptions are brief but adequate, and supplement the key characters. Too many descriptive floras, even the oldest and most thoroughly revised, might be decreased in bulk twenty-five per cent if superfluous descriptive phrases common to many species were omitted. Ranges are given concisely but with unusual fulness, accompanied by an indication of zonal distribution. Dates of flowering are included, as well as all essential synonymy. In spite of its large number of pages the book is of convenient size. Its typography is very pleasing, although unfortunately disfigured by an inordinate number of typographical errors, which, it would seem, could have been avoided.

Those who have attempted the preparation of similar botanical works understand the immense amount of labor, some of it drudgery unappreciated by the casual reader, which the completion of such a publication entails. A large part of an author's reward consists in his own sense of satisfaction at a task well done, but in this instance Dr. Rydberg will also receive the grateful appreciation of botanists, especially those of the West, for a volume that will be indispensable for many years, and will long stand as a monument to the industry, enthusiasm, and discriminating vision of its author.

PAUL C. STANDLEY

**Two Connecticut forest reports***

The data for the first publication were gathered by traversing "every road" (?) in an automobile and plotting the forest areas on U. S. Geological Survey topographic maps. The length of time required is not clearly indicated, but except for three counties previously surveyed by other parties the field work seems to have begun in 1913 and ended in 1914.

About three pages are devoted to the three physiographic provinces: western upland, central lowland (Triassic), and eastern upland. There are about two pages on forest types (ten in number), 15 pages on forest conditions by counties, 3 pages on destructive influences (fungi, insects and fire), and about 2 pages of interesting historical notes. Then follow tables giving the actual and relative wooded area of each county and town. One of the maps shows by seven different shadings the approximate percentage of forest in each town, and the other the general location of the larger forest areas; both of which should be useful to botanists planning field work in Connecticut. The wooded area by counties ranges from 31 per cent in Fairfield County to 56 per cent in Tolland, and by towns from 5 per cent in Hartford to 88 per cent in Voluntown. The percentage for the whole state is 46.4. (No estimates of the forest area at earlier periods are given, but the reviewer has recently estimated from census figures that Connecticut had more woodland in 1910 than in 1790).† In 1893 the U. S. Geological Survey, in coöperation

* Moss, Albert E. A forest survey of Connecticut. Rep. Conn. Agric. Exp. Sta. **39**: 197–230. 2 maps. New Haven, 1916.

————. A forest survey of the town of Redding, Conn. Rep. Conn. Agric. Exp. Sta. **40**: 383–427. New Haven, 1917.

† See the current (April) number of the Journal of Forestry (Washington, D. C.)

with the State of Connecticut, published a topographic map of the State, on a scale of 1 : 125,000, showing the wooded areas in green;* and from this Dr. Henry Gannett a few years later† computed the forest area to be 39 per cent of the total; or considerably less than at present, assuming both estimates to be equally accurate.

As far as it goes this is an interesting and useful report. It would have been more serviceable, however, if it had included an estimate of the average stand of timber per acre in each town or county, and a list of tree species, in approximate order of abundance, with notes on distribution. Possibly those are to be supplied in future reports.

The second publication noted describes the forests of one town in the western part of the state in considerable detail, presumably as a model for a similar treatment of other towns to be reported on later. The work was done in the summer of 1915. The text begins with a general survey of conditions, discussing among other things the reversion of much farm land to forest since the middle of the last century (a phenomenon common to several northeastern states), on account of improved transportation facilities making the farm products of the West more accessible.

Six pages are devoted to the eight most important tree species, and seven to the eight forest types. The forests of each of the minor physiographic divisions of the town are described in some detail, and there are several pages of recommendations for fire protection, improvement cuttings, and tree planting, with estimates of the cost and profits of forest management.

Nearly half the area of the town is wooded or uncultivated, 33 per cent of the forest is classed as mixed hardwoods, 21 per cent as oak, 21 per cent as old field type, 14 per cent swamp, 8 per cent oak and chestnut, and so on. The report closes with a list of the principal tree species of the town, about fifty in number, but there is no indication of what proportion of the total forest

* This map appears to be very rare and little known. It is not mentioned in Mr. Moss's report, and the reviewer recently found no trace of it at the U. S. Forest Service, and unearthed a single copy at the Geological Survey only after about an hour's search.

† Nineteenth Ann. Rep. U. S. Geol. Surv. 5; 4. 1899.

stand each constitutes: which probably could have been ascertained roughly with very little extra effort.

Roland M. Harper

## PROCEEDINGS OF THE CLUB

### February 12, 1918

The meeting was held at the American Museum of Natural History at 8:15 P.M. President Richards presided. There were thirty-five persons present.

The reading of the minutes of the last meeting was dispensed with. The secretary read notices of the death of Miss Elizabeth Jacobs and Miss Rosalie Schumacher, members of the Club for many years.

The nomination and election of Miss Bernice Jenkins, 103 East 16th Street, New York City, and Miss Caroline Seifert, Mt. Vernon, N. Y., followed.

The announced scientific program consisted of a lecture on "Botanical Exploration in Colombia" by Professor H. H. Rusby.

Adjournment followed.

B. O. Dodge, *Secretary*

### February 27, 1918

The meeting was held in the Morphological Laboratory of the New York Botanical Garden at 3:30 P.M. Vice-President Barnhart presided. There were twenty-six persons present.

The minutes of the meetings held January 30 and February 12 were read and approved.

Under the head of new business Mr. Percy Wilson presented a report on part of the program arranged for holding field excursions.

The Secretary read a communication from the Kansas Academy of Science, announcing a proposed celebration of a semi-centennial anniversary of the Society. Professor Raymond J. Pool, of the University of Nebraska, was appointed delegate of the Torrey Club to attend the meetings to be held March 15 and 16.

The announced scientific program: "Gill fungi of Tropical

North America," Dr. W. A. Murrill; "Botanizing with a Camera" Mrs. E. G. Britton, was carried out and other members of the Club also presented photographs for inspection and took part in the discussions.

Mrs. Britton stated that she had been lecturing to schools and local Garden Clubs on "*Botanizing with a Camera*" and gave a brief abstract of her methods of illustrating this lecture and of encouraging the *teachers* and *children* to take pictures in their localities. She exhibited a series of lantern slides and photographs from J. Horace McFarland Co., of Harrisburg, Pa., and followed it with ten books of hand-colored photographs made by Miss Elsie M. Kittredge, including about 1,800 photographs representing 800 species, as color records for her sets of lantern slides, all of which were much admired and appreciated by the members present. Mrs. Britton also showed a set of uncolored photographs taken by Asahel Curtis on the slopes of Mt. Rainier, Washington, including many beautiful wild flowers, and stated that Dr. Kirkwood had been able to recognize and name many of them for her.

Mr. O. P. Medsger of Arlington, N. J., also exhibited some photographs of wild flowers with their insect visitors.

B. O. Dodge demonstrated the use of stereoscopic views in connection with studies of rusts and other small plants. Some of the views shown were photographs taken with a binocular microscope camera. He explained how stereoscopic views could be taken with the ordinary camera.

Dr. R. M. Harper, who has been interested for many years in making stereoscopic pictures of plant life, explained his method of taking the views with the ordinary camera.

Dr. W. A. Murrill spoke of his investigations of the gill-fungi of tropical North America, which he has just completed, the final paper on this subject appearing in the March number of *Mycologia*. "Some of the larger genera were mentioned and the number of species in them compared with those of temperate regions. Of the 525 tropical species recognized by Dr. Murrill in his studies, 300 have been described by him as new.

Although the material in hand has all been worked over, this does not mean that the work on tropical gill-fungi has been completed. Indeed, it has just begun, and collectors will now have a basis on which to do more satisfactory work. Mexico has hardly been touched and the same may be said for Santo Domingo and many other parts of the West Indies, as well as nearly all of Central America. Cuba is fairly well known from the extensive collections of Charles Wright, and from the work of many recent collectors. Martinique and Guadeloupe have been rather thoroughly worked by Pere Duss who sent his collections to Patouillard to be named. Jamaica is better known mycologically than Porto Rico, so far as the larger fungi are concerned, but both of these islands need to be worked more carefully.

If a careful mycologist could spend half of his time in tropical North America making specimens, notes and drawings, and the remainder in a good herbarium and library working them up, the results accomplished would be noteworthy.

Dr. Murrill discussed at length the wide difference existing between the species found in our tropics and in the temperate regions of North America, and he described and tried to explain the sporadic and scattered occurrence of the gill-fungi in portions of the tropics that he had visited. Professor Fink, who has recently been to Porto Rico, ascribes the infrequent occurrence of the gill fungi there partly to the great tropical heat and also to the fact that the development of the hymenophores is often spread equally throughout the year, instead of taking place all at once, as in colder climates."

Adjournment followed. B. O. Dodge, *Secretary*

## NEWS ITEMS

The Ecological Society of America in its *Bulletin* for March, 1918 (Vol. 2, no. 3), gives a most interesting report from the Committee on the Preservation of Natural Conditions for Ecological Study. This Committee was appointed in the summer of 1917 and consists of twenty members who are seeking information for a card index of all important ecological areas which already are protected or are in need of preservation. This will include the following areas: forest, prairie, swamp, stream, bog, pond, shore, dune or desert communities of plants, especially those that are unique or very accessible. Copies of these record cards may be had from the Chairman, V. E. Shelford, 506 W. Iowa Street, Urbana, Illinois. Stations for such rare plants as the "Hart's-tongue" fern at Green Pond near Syracuse or the "*American Lotus*" at Great Sodus Bay, on Lake Ontario, or Swartzwood Lake, New Jersey, are certainly worthy of conservation and we hope that all who may read this notice will give their influence and assistance to this Committee.

Dr. E. B. Southwick, for many years the City Entomologist, and who managed the Shakespeare and Perennial Garden in Central Park with such conspicuous success, has been appointed Custodian of the Herbaceous Collections at the New York Botanical Garden. As Dr. Britton points out in a recent number of the *Journal* of that institution it is a peculiarly fitting appointment not only from a horticultural standpoint but because Dr. Southwick is a lineal descendant of Jonas Bronk, from whom the Bronx takes its name, and the collections of which he has charge are within a moment's walk of the Bronx River.

On May 20, the Brooklyn Heights Seminary Club visited the Brooklyn Botanic Garden in a body. The National Farm and Garden Association held its convention there May 23, and on May 28, the Annual Inspection by the Trustees, Garden Members and other invited guests was followed by a tea.

# The Torrey Botanical Club

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Vol. 18 June, 1918 No. 6

# TORREYA

A Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873

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# THE TORREY BOTANICAL CLUB




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NORMAN TAYLOR
Brooklyn Botanic Garden
Brooklyn, N. Y

② TORREYA

June, 1918

Vol. 18 No. 6

# THE FLORA OF INDIAN LADDER AND VICINITY: TOGETHER WITH DESCRIPTIVE NOTES ON THE SCENERY

By Stewart H. Burnham

"Fair Helderberg,
"O mountain fair, blue line against the sky!
Thy wooded steeps, thy cool secluded trails,
Thy dells, thy caves, and laughing waterfalls,
All rainbow-haloed in the mellow light—
How fondly turn thy loyal sons to thee,
With pure delight to greet thy sylvan joys!"

*May 12, 1906.* We left Albany, at noon, and went to Indian Ladder in the Helderberg mountains, Albany county, fourteen miles due west of the city. We got off the train at Meadowdale (formerly known as Guilderland) on the Susquehanna division of the Delaware & Hudson railroad. It was a splendid afternoon, in spite of the threatening shower, and inspiring scenery.

The walk from Meadowdale to the top of the cliffs, where the wagon road passes over the site of the famous Indian Ladder, is about two miles; if one takes the private road half a mile from the village, beyond a white house and a red barn. Soon the ascent of the long hill begins, the road skirting the base of the western cliffs, and overlooking the large amphitheater-like valley in which a stream flows, formed by the confluence of two or three streams from above. Two of the streams leap from the cliffs in pretty waterfalls, about 100 feet in height, and a large stream also issues from the base of the cliff along the Bear path.

The valley is well wooded with deciduous trees, and the eastern side has a fine growth of canoe birch, *Betula papy-*

[No. 5, Vol. 18 of Torreya, comprising pp. 81–100, was issued 4 June 1918.]

*rifera* Marsh., now putting forth the noticeable yellow-green foliage. Most of the time was spent in traversing the trail at the base of the cliffs. After venturing a short distance along the trail, on the same level as the roadbed, we soon came to the end at a dizzy height. Returning to the road, we took the trail along the base of the cliffs, from which in several places one may climb to upper ledges and explore cavernous recesses in the rocks. Along the path one can enter Giant's Castle, a dark cavernous fissure; and walk several steps nearly erect. Nearby is a cave above the trail, reached only by climbing an old tree trunk placed against the cliff, and entering the cavern head foremost. When one makes their exit they must come out feet foremost and clamber down the trunk to the path.

Soon after leaving this spot, we passed fifteen students of geology from Williams College, accompanied by Prof. H. F. Cleland, on their fourth annual outing to the Helderbergs. They entered the mountains at New Salem, near where the Bear path begins, skirting Countryman Hill, 1,694 feet in height. This section for many years has been a Mecca to geological students; and the name Helderberg is a familiar one in geological literature.

The Mine Lot Fall is the prettiest of the waterfalls, the water to-day falling near two banks of snow. Along the trail, the lower side of which takes on somewhat the character of a talus slope, the rocks are covered with lichens, mosses and ferns. Beyond the Mine Lot we rested before climbing the wooden ladder in Craig Court, a square embrasure in the cliffs. We went a short distance along the brow of the cliffs east, to the promontory where the rocks form an old man's face; but the coming shower turned us back, and we hastily retraced our steps along the cliffs to the Indian Ladder road.

The view from the lookouts along the brow of the cliff are magnificent, over the Taughannock-like amphitheater at our feet, and one can see for miles into the northland, although to-day the clouds are dark and lowering. Not being aware of such a picturesque accessible spot near Albany, one feels that they will be repaid to frequently visit this mountain retreat.

FIG. 1. The battlements of the Dome and Indian Ladder_Road.

"The Indian ladder took the name from the fact that the Indians of Schoharie valley, upon their trading trips to this section of the Hudson, felled a tree against the face of the cliff, which opposed their trail, and used it as their ladder."

The word Helderberg signifies "clear mountain." The cliffs rise about 800 feet above the valley, or 1,200 feet above sea level. The geological formation as given on the New York State geological map is

Helderberg limestones
- Water-lime beds
- Cliff
  - Tentaculites (Manlius), shabby limestone
  - Pentamerus (Coeymans), massive limestone
- Shaly limestone (at the top)
- Becraft limestone (half a mile back)

The following plants were seen or collected, on the cliffs, along their base and at the top. *Collema tenax* (Sw.) Ach. and *Leptogium lacerum* (Retz.) S. F. Gray on moist rocks among mosses in the spray of Mine Lot Fall; *Parmelia caperata* (L.) Ach. on *Betula lutea;* and *Urceolaria scruposa* (Schreb.) Ach. on rocks.

*Porella platyphylla* (L.) Lindb.

*Anomodon rostratus* (Hedw.) Schimp. and *Anomodon viticulosus* (L.) Hook. & Tayl., sides of the cliffs; *Mnium cuspidatum* (L.) Leyss and *Timmia cucullata* Mx. on soil at base of cliffs.

*Cryptogramma Stelleri* (Gmel.) Prantl in mosses along the face of the cliffs.

*Juniperus sibirica* Burgsd.; *Trillium erectum* L.; *Asarum canadense* L.; *Cerastium arvense* L., a very showy plant with large white flowers, growing in the clefts of the rocks along the upper part of the carriage road; *Aquilegia canadensis* L.; *Arabis lyrata* L., the flowers fragrant; *Dentaria laciniata* L.; *Dentaria maxima* Nutt.; early saxifrage, *Micranthes virginiensis* (Mx.) Small; *Waldsteinia fragarioides* (Mx.) Tratt. and *Lonicera canadensis* Marsh.

*July 22, 1906.* We left the city on the morning train. It was

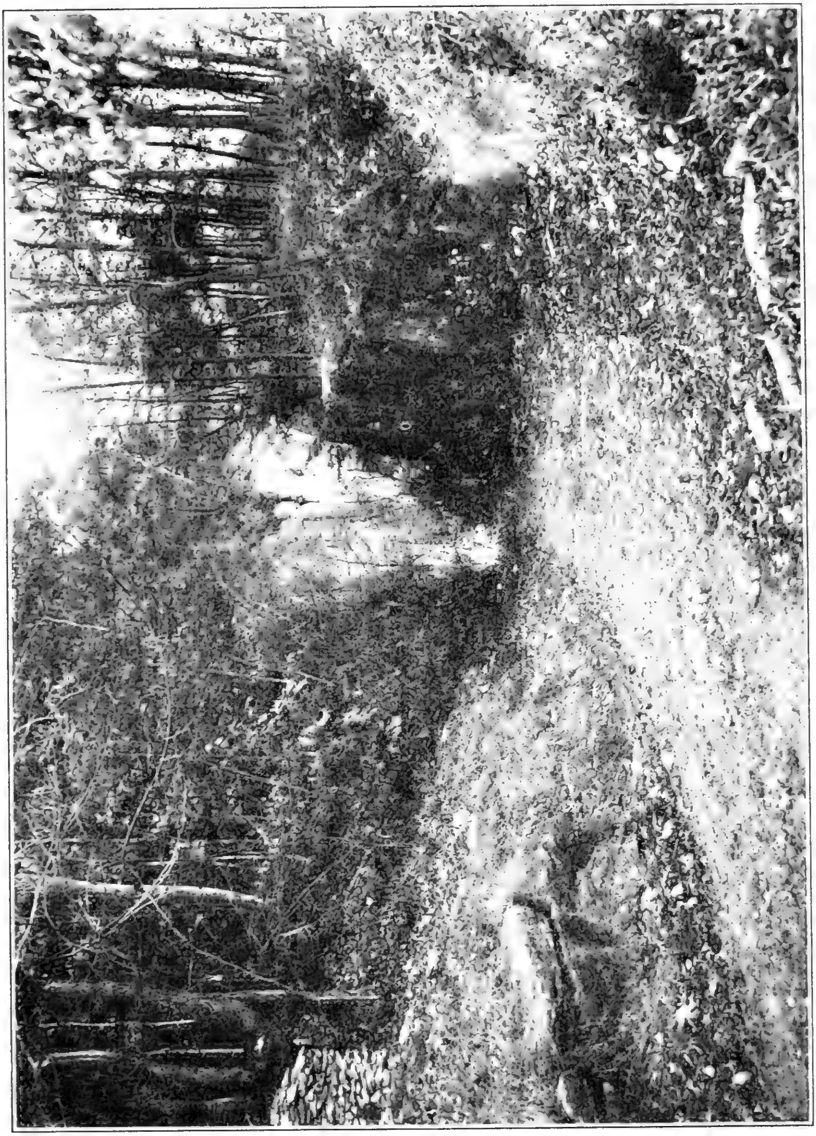

FIG. 2. The Summit of Indian Ladder Road.

very warm climbing the Indian Ladder road, both for pedestrians and horses. Below the road at the parting of the two rocky diverging gorges in the main amphitheater is a little open spot known as the "'Tory Hook' or Plat." Here Black creek, filled with water-worn boulders, descends through "the damp, thick woods of oak, hickory, . . . elm, basswood (linden), butternut, ash, beech and birch with a white pine and hemlock . . . give color to the scenery, heightened by the green graceful frondage of the scarlet-fruited sumac, the trailing cordage of the wild grape-vines and numberless other wild plants." The old Indian trail led up this valley; and where the precipice does not exceed 20 feet in height stood the tree trunk—the old ladder, which was in daily use as late as 1820. The cliff has been blasted away for the roadbed. Overhanging the road at this point is "The Dome," and the path beneath leads to a semicircular cavity in the cliff known as the Tory House.

Following the Bear path along the base of the cliff, one comes to a large spring of ice-cold water issuing from a dark opening. The opening is about 3 feet high by 6 to 8 feet wide, narrowing inward. The temperature of the air of this spring remains about 54°, the year round. Giant's Castle is the next object of interest and then Small or "Dry Fall," falling unbroken 80 feet and issuing from the talus in two cascades and then to disappear again for some distance down the gorge. There was no water in the waterfall to-day.

Further east, the overhanging cliffs are 126 feet in height; and here is the "Big," "Mine Lot," or "Indian Ladder" Fall, falling 116 feet. There is considerable water to-day; "a silvery rope of spray, with a whispering rush, sweeping before it damp, chilly eddies of fugitive air, that sways the watery cable to and fro." But as the water strikes the huge rocks at the base, it is turned to spray and from time to time wafted by the slight breeze stirring. One of the species of *Vaucheria*, in large felt-like masses, grows here and in the cold spring. There are several mosses here; but only *Amblystegium filicinum* (L.) DeNot. and *Mnium punctatum* L. with stolons were collected.

Back of the Mine Lot Fall is what is known as the "Red Paint

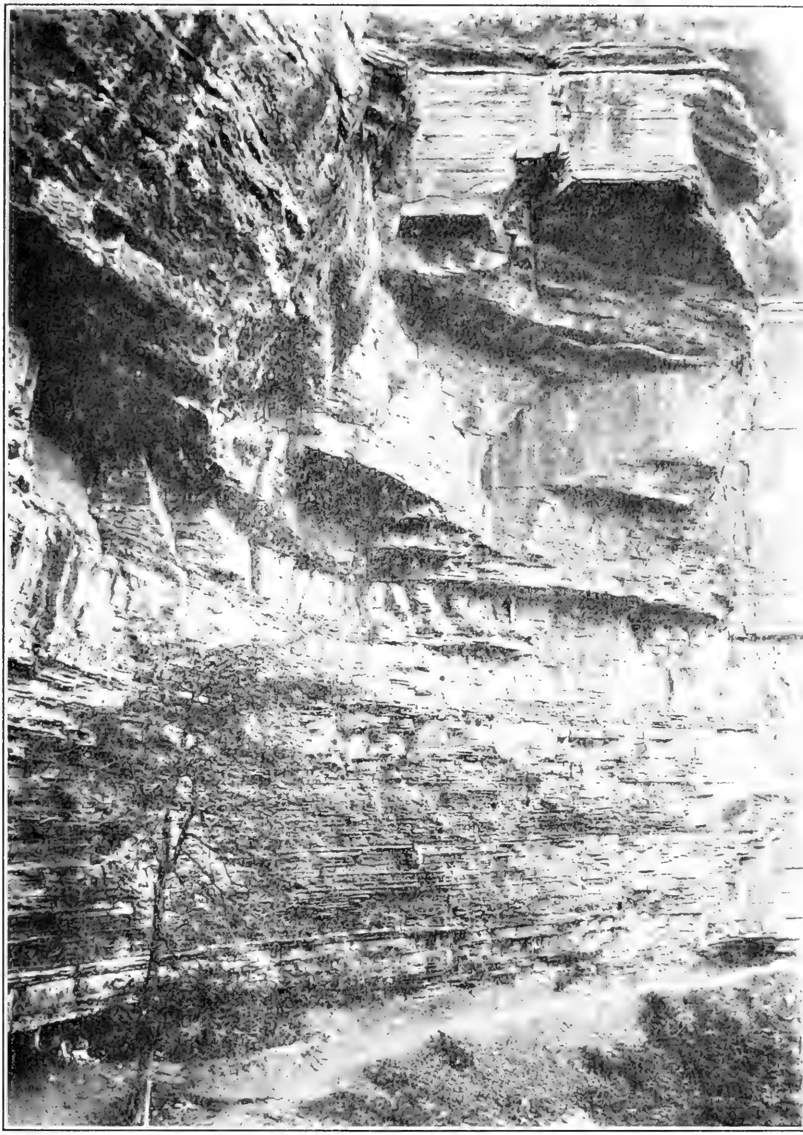

FIG. 3. The bear path near Mine Lot Fall and the Red Paint Mine at the base of the cliff.

Mine," a low horizontal cavity, from 4 to 6 feet high, 50 to 60 feet long and 15 feet deep. There is a vein of iron pyrites, decomposing into yellow oxid of iron and gypsum; also white copperas and acicular crystals of Epsom salts. Further eastward we climbed the ladder to the top of the cliffs and lunched and rested on Hanging or Table Rock, at the brow of Mine Lot Fall. Here is a grand view of a "widespread level country, a true basin of the Hudson and the Mohawk—a deep valley more than sixty miles in width, bounded by distant mountain chains. . . . You can see nearest, the deep savage valley, with shades predominating, mountain-walled; checkered fields and woods beyond in vast prospective"; distant farms and villages; "last, the blue, ragged outline of the northern granite mountains. . . ."

Later in the afternoon we wandered eastward through the woods, and from the ruined tower on the edge of the cliff, which Verplanck Colvin in 1869 likens to an old feudal watch-tower, a fine view of the eastern amphitheater was enjoyed. This tower was built by an Albanian many years ago and formerly had an outside platform; but is now being slowly destroyed by vandals. Continuing eastward and crossing the stream which flows down through Glen Doon, we came to the summer cottages on East Cliff. If the air is right one can converse across the gulf between this cliff and the Indian Ladder road, a distance of over half a mile. At other times one can hear speech; but cannot converse. There are many fossils in the rocks here, but the most abundant of the Upper Silurian fossils is the shell *Pentamerus galeatus.*

Late in the afternoon we descended the ravine of Glen Doon, also known as Mosquito Hollow, a stream bed of boulders, which half a mile below let us out into pastures of goldenrod. Along the upper part of the ravine the immense rocks are covered with ferns and mosses, but near the lowlands is a stratum of Hudson River shale, and we found a little standing water. There is much decayed wood in the ravine, and it is probably a good place for fungi in a favorable season.

Many berries were ripe: wild gooseberries, high-bush blackberries, red raspberries, running dewberries, purple-flowering raspberries, strawberries, two kinds of shadberries and choke cherries.

The following plants were seen or collected: *Cantharellus cibarius* Fr.; *Cantharellus floccosus* Schw.; *Exidiopsis alba* C. G. Lloyd on fallen red maple trunk; *Flammula expansa* Pk. on fallen red maple trunk, type station (in part); *Ganoderma Tsugae* Murrill on hemlock and *Tricholoma album* (Schaeff.) Quel.

*Cryptogramma Stelleri* (Gmel.) Prantl in Glen Doon; *Dryopteris marginalis* (L.) A. Gray; and *Filix bulbifera* (L.) Underw., very graceful and abundant, usually reclining from crevices in the cliffs; but under Mine Lot the fronds erect themselves to get the required light.

*Hystrix Hystrix* (L.) Millsp.; *Quercus coccinea* Wang.; *Rubus odoratus* L., a fine thicket and a plant well worthy for ornamental cultivation; *Rosa blanda* Ait., with a *Phragmidium* rust attacking the fruit and stems; *Amelanchier spicata* (Lam.) C. Koch, with the *Roestelia* stage of a *Gymnosporangium* rust attacking the fruit; *Staphylea trifolia* L.; *Cornus rugosa* Lam. (*C. circinata* L'Her.), two forms, one with narrower leaves than usual; red bearberry, *Uva-Ursi Uva-Ursi* (L.) Britton, abundant on East Cliff; *Lonicera dioica* L., conspicuous in fruit; *Viburnum pubescens* (Ait.) Pursh; and *Campanula rotundifolia* L. at Hanging Rock, the flowers small, which is probably due to the lateness of the season.

*Sept. 29, 1906.* We left Albany on the noon train. Not many of the leaves were turned; dogwood and sumac show some scarlet color and the white birches are beginning to turn yellow.

Very many fine views were had from the cliffs into the amphitheater of wooded ravines. During the early afternoon two katydids were heard, when on the way up the road; but they had become fairly abundant when we descended, in the late afternoon.

A bright little boy, by the name of Hallenbeck, from the farmhouse above Indian Ladder, acted as guide to Helmus Crack, half a mile west of the wagon road. This is a joint plane fissure in the cliff, and is also known as "The Crevice." One is obliged to turn sideways at the upper end in order to slip down through

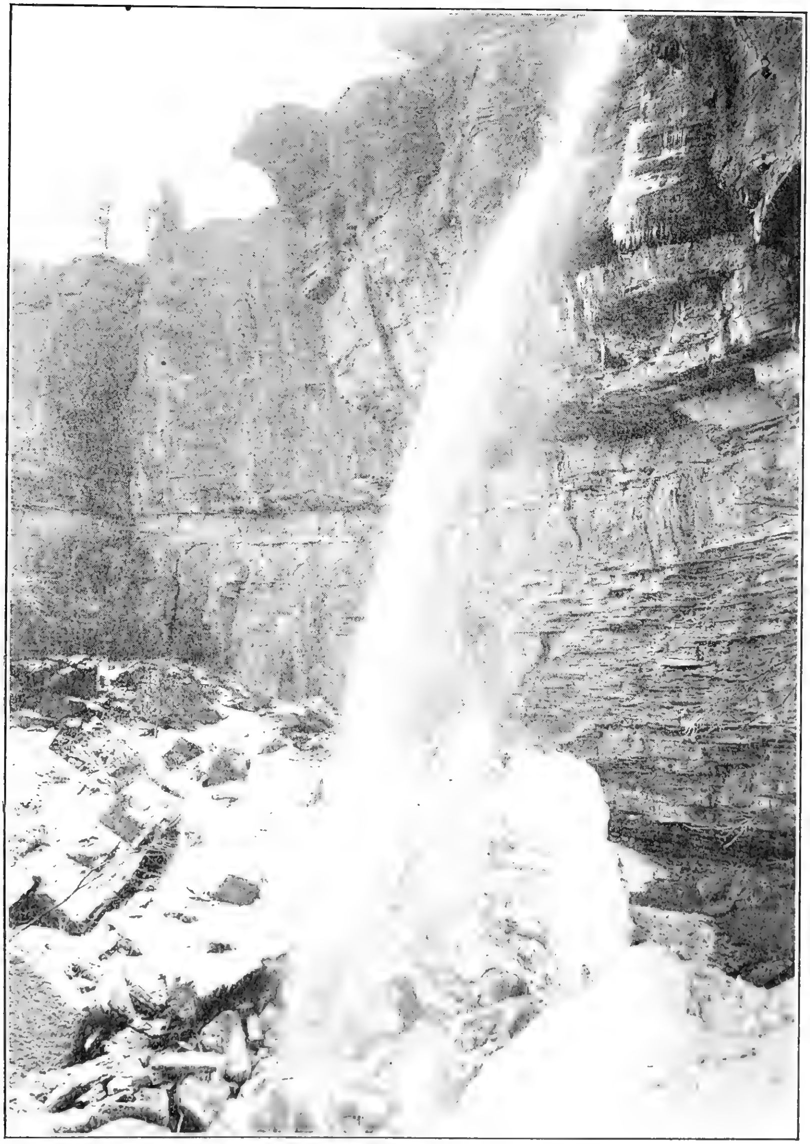

FIG. 4. The Mine Lot Fall in early spring.

the rocks and it is certainly a fat man's misery. About an eighth of a mile beyond the Crack is Sutphen's Cave or Hailes's Cavern; "2½ miles, 1885, explored by T. C. Hailes, E. C. Armstrong and F. H. Maguire," according to the legend on the rock above the entrance. A certain fellow by the name of Dan Lynch states the distance to be 10 miles in red paint, and he probably thought it was, if he went far. We only went a few steps beyond the low entrance, over a pile of loose rocks, but one has to bend almost double and it is wet, cold and clayey. It is but an old stream bed, and a great abundance of water flows out in the spring of the year and down to the valley below over the immense boulders, which have fallen from the cliffs 105 feet above. The cliff is curiously fissured and there are three immense square openings—"Proscenium Arches"—in the face of the cliff, extending back of the original cliff. The openings are like huge doors, the smaller opening being inmost and contains the mouth of the cavern. The well-beaten trail ends apparently a short distance beyond the cave; however, it probably continues on to near Altamont.

The site of the old lime kiln at the top of the cliff near Small Fall was discovered.

The following plants were observed or collected: *Daedalea confragosa* (Bolt.) Pers. on yellow birch logs and beech limbs.

*Pannaria lanuginosa* (Ach.) Koerb.

*Amblystegium varium* (Hedw.) Lindb.; *Brachythecium rivulare* B. & S. and *Eurhynchium rusciforme* (Neck.) Milde.

*Dryopteris marginalis* (L.) A. Gray, a form with pinnae scarcely dentate; and *Polypodium vulgare* L.

*Vitis bicolor* LeConte with sweet fruit; and *Symphoricarpos pauciflorus* (Robbins) Britton in fruit.

*October 27, 1906.* To Indian Ladder on the noon train. I followed the creek up from the wagon road, up the rugged ravine of Mine Lot, with many a scramble over fallen logs and around immense boulders. The conspicuous bare spot on the east bank, at the lower end of the gulf, is composed of black crumbling shaly rock mixed with sand strata. Part way up the glen, a fine view of the silvery thread of the waterfall, through the forest, is to be seen. It was some time before I could make it seem possible that the square battlements of Table Rock and other prominences were not a portion of man's handiwork; verily, they suggest the parapets of the castle of some feudal king. Did not the Indians have a name for Mine Lot Fall? The people who follow the beaten trail along the base of the cliffs lose much of the beauty of the spot.

One finds many robin and other bird nests in the low-browsed and branched elm bushes below Tory Hook. The woods were aflame with the witch-hazel. Returned through Glen Doon, where, lower down, it reminds one of the Adirondack woods. The sharp-lobed hepatica is very abundant here, and often with unblotched leaves.

The following plants found or observed: *Cantharellus aurantiacus* (Wulf.) Fr.; *Chlorosplenium aeruginosum* (Oeder) DeNot. on old logs; *Collybia velutipes* (Curt.) Quel. on elm logs; *Fomes fomentarius* (L.) Gill. on beech and birch; *Fomes pinicola* (Sw.) Cke. on birch (!) logs; *Geaster saccatus* Fr.; *Helotium citrinum* (Hedw.) Fr. on old logs; *Hypholoma perplexum* Pk.; *Lycoperdon Wrightii* B. & C.; *Marasmius siccus* (Schw.) Fr.; *Pholiota Johnsoniana* Pk.; *Pleurotus ostreatus* (Jacq.) Quel. on maple stumps; *Pleurotus porrigens* (Pers.) Quel. on hemlock logs and stumps; *Pleurotus ulmarius* (Bull.) Quel. on elm; *Pluteus cervinus* (Schaeff.) Quel. on old stumps; *Polyporus brumalis* (Pers.) Fr. on elm and other logs; *Polyporus caesius* (Schrad.) Fr. on birch and other wood; *Polyporus chioneus* Fr. on birch limbs; *Polyporus resinosus* (Schrad.) Fr. on basswood and other logs; *Poria radiculosa* (Pk.) Sacc. on old logs; *Poria subacida* (Pk.) Sacc. on old logs and *Tricholoma personatum* (Fr.) Quel.

*Peltigera aphthosa* (L.) Willd. and *Peltigera canina* (L.) Hoffm.

*Amblystegium orthocladon* (Bv.) P. Kindb., var.; *Dicranum flagellare* Hedw.; *Entodon cladorrhizans* (Hedw.) C.M.; *Hypnum Haldanianum* Grev. on decaying logs; *Hypnum tenuirostris* (B. & S.) Broth.; *Neckera gracilis* (James) Kindb., at the base of Mine Lot Fall, found there about 1869 by Verplanck Colvin, who reported it under the name *Homalia trichomanoides,* *Rhytidium rugosum* (L.) Kindb., brow of the cliffs, the yellow green loose mats very handsome; and *Thuidium delicatulum* (L.) Mitt.

*Adiantum pedatum* L.; *Asplenium Trichomanes* L.; *Camptosorus rhizophyllus* (L.) Link, not rare at the base of Mine Lot and in Glen Doon; *Dryopteris intermedia* (Muhl.) A. Gray; and *Polystichum acrostichoides* (Mx.) Schott., only found near the lowlands in clayey soil and entirely disappearing a short distance up the glens. I was not aware before of its avoidance of calcareous soils.

*March 23, 1907.* In the afternoon to the Indian Ladder country, finding the roads quite dry and dusty. Many robins, a blue jay and other birds. Where the road begins the steep ascent of the hill, we left it for a rough climb around the hillside through the woods to the stream from Hailes's Cavern. Evergreen ferns, principally *Dryopteris marginalis* (L.) A. Gray and its var. *elegans* (J. Robinson) Carhart. The walking was not always sure, on account of the frozen soil beneath the leaf mould. The stream was full banked and very musical and might be called a mountain cascade, as the drop from the cavern's mouth is very abrupt and over a rocky bed. The cavern's mouth to-day was two thirds filled with water. Rather than to descend the steep mountain side, we stamped several steps up through a bank of almost perpendicular snow to the path above, and were obliged to do the same thing through Helmus Crack. We could see Mt. Equinox and Bear Mountain in Vermont, 50 miles to the northeast, from the brow of the cliffs.

Both Small and Mine Lot waterfalls fall into ice cones. The cone of the former fall reached nearly to the top of the cliff, and of the latter part way, but was of more gigantic proportions. Huge icicles, 25 to 30 feet long, hang from projecting rocks. These ice cones and banks of snow completely obstructed the path along the base of the cliffs. On East Cliff we visited the new cottage, on the brow above Fallen Rocks, enclosed and nearing completion. A splendid site, for here the high water stream falls about 125 feet to the rocks below, a magnificent waterfall of ethereal whiteness—the Bridal Veil of this picturesque region.

FIG. 5. Craig Court.

We took the short-cut trail from the flagpole on East Cliff, saving about 1½ miles. It descends abruptly through a clearing into lower Glen Doon ravine. A piece of calcite was picked up along the trail, and along the upper cliffs *Asplenium Ruta-muraria* L. was found.

The following plants were observed or collected: The hickory louse gall, *Phylloxera Caryaecaulis* Fitch, abundant on branches of *Hicoria ovata* at the foot of Indian Ladder road.

*Dichaena faginea* (Pers.) Fr. on living *Fagus grandifolia; Polystictus conchifer* (Schw.) on fallen elm limbs; *Polystictus versicolor* (L.) Fr.; and *Tremella aurantia* Schw. on hemlock logs.

*Biatora vernalis* (L.) Fr., on the ground, determined by Dr. Bruce Fink; *Lecanora pallida cancriformis* (Hoffm.) Tuck. on wood; *Parmelia tiliacea* (Hoffm.) Ach. on trunks of yellow birch; *Placodium elegans* (Link) Ach. on rocks in the stream at the mouth of Hailes's Cavern.

*Brachythecium salebrosum* (Hoffm.) B. & S.; *Eurhynchium strigosum* (Hoffm.) B. & S.; and *Thelia asprella* (Schimp.) Sulliv. at base of living trees.

*May 5, 1907.* We left Albany on a morning train. Visited the Tory House just north of the high overhanging cliff of the Dome near the upper end of the wagon road. During the Revolutionary War it is said to have been used as a retreat by the Indians and tories, and the name was given to it because a noted tory by the name of Jacob Salisbury was captured there. It is perhaps 25 to 30 feet in diameter, and although there is no perceptible opening in the rocks forming the roof of the recess, still smoke from a fire will find an egress somewhere. Visited Helmus Crack and Hailes's Cavern; then along the Bear path. Both of the waterfalls still beautiful, but there was an arch of ice still at the foot of Mine Lot Fall. The canoe birches seen from Hanging Rock were fine, with bark as white as chalk. A clear day, and we could see Albany, Schenectady, Mechanicsville, Ballston and Saratoga Springs; Mt. Equinox and Bear Mountain in Vermont; Mt. Antonio near Luzerne and the mountains about the southern end of Lake George. Late in the afternoon we descended from East Cliff by the short-cut trail.

The following plants were seen or collected: *Biatorella simplex* (Dav.) Br. & Rost. (*Lecanora privigna* (Ach.) Nyl.) on loose calcareous stones on East Cliff, determined by Dr. Fink, deposited in the State Herbarium as new to the State; and the rare lichen, *Solorina saccata* (L.) Ach. along the path at the foot of the ladder in Craig Court and along the short-cut trail.

Spring is even backward here but the ferns were starting. *Erythronium americanum* Ker.; *Hepatica acutiloba* DC. very abundant in woods at base of East Cliff; *Thalictrum dioicum* L.; *Sanguinaria canadensis* L.; *Amelanchier canadensis* (L.) Medic.; *Epigaea repens* L. grows in an open pasture back from the cliffs; and *Pedicularis canadensis* L. with the young foliage purplish.

*July 13, 1907.* We left the city at 2.15, which gave us only time to go to the East Cliff and return by the fields north of Fallen Rocks. Hermit thrushes in the hemlock woods. Part of the climb was up an old slide from the cliffs, and the purple cliff-brake, *Pellaea atropurpurea* (L.) Link, was found quite abundantly, but often out of reach, on the face of the cliffs.

The following plants were collected or seen: *Poria vaporaria* (Pers.) Fr. on under side of poplar logs.

*Pannaria nigra* (Ach.) Nyl. on loose stones, determined by Dr. Fink.

*Dicranum flagellare* Hedw. in dense cushions on loose rocky soil; and *Hypnum curvifolium* Hedw. on a rock.

*Galeorchis spectabilis* (L.) Rydb.; *Limnorchis huronensis* (Nutt.) Rydb., one plant; *Parietaria pennsylvanica* Muhl.; *Atragene americana* Sims, not very rare; *Menispermum canadense* L. on fences and *Vicia angustifolia* L., grain fields in the valley; *Acer spicatum* Lam.; *Viola renifolia* A. Gray; *Washingtonia longistylis* (Torr.) Britton, somewhat pubescent, the fruit tastes like anise, found along hedgerows in the valley; *Pyrola secunda* L.; *Cynoglossum boreale* Fernald, two fruiting plants at top of the cliff; *Lonicera dioica* L., a form with leaves not connate; and *Lonicera hirsuta* Eaton.

*(To be continued)*

# BOTANICAL ERRORS OF SOME WELL-KNOWN WRITERS

By Jean Broadhurst

One of our best-known weekly publications recently printed a *vers libre* effusion on sugar in which Amy Lowell confused the coarse, whitish, turnip-like root commercially termed the sugar beet with the red beet so well known as a table vegetable. She wrote (in part) as follows (*Independent*, 29 December):

> Wide plains
> With little red balls hidden under them,
> Beets like a hidden pavement underneath the plains,
> A Roman floor forsooth!
> Do mosaics have any colors to equal these?
> Red as the eyes of cats in firelight,
> As carbuncles under a lemon moon,
> As the sun swirling out of a foggy sky,
> Round as apples,
> Footed as tops,
> You spin yourself deep into the earth
> And swell and fatten
> Sugar in a crimson coat,
> . . . . . . . . . . . . . . . .
> There are still the blood-skinned beets,
> Waiting to be crushed, pulped, and eaten,
> Thunder sugar—blood sugar.
> . . . . . . . . . . . . . . . .

These mistakes are, perhaps, a little more amusing than those commonly made by well-known authors; but it is unfortunately true that our prose and poetry contain many similar errors.

The commonest error is describing as blooming together flowers that bloom weeks or even months apart! If the color scheme suits the author, that is sufficient; why be hampered by truth—or limited by the seasons? And so we read of April violets amid the July lilies and the August goldenrod! In the same well-known "nature novel" by Gene Stratton Porter common market mushrooms are found in profitable abundance before the leaves appear on the trees! Even Jean Ingelow is jubilant over a riot of (March–April) daffodils and (June–July) buttercups!

Then there are several writers who find "beauty unadorned" unsatisfying. Christmas trees growing on the hillside make no appeal in their fresh clean greenness, but must be described as naturally becandled; an impossibility, as the balsam fir—the only one of the Eastern evergreens with erect cones that look at all like candles—never retains whole cones through the winter, the cones dropping off, scale by scale, long before Christmas. Our other Eastern cone-bearing trees have *hanging* cones; the most imaginative of our writers could not call them candles.

If ornamental plants have their associated errors, economic ones have their "ten thousands." Hay on its way to the barn is never "foaming golden yellow." No farmer would even cut hay so full of foreign plants that it appeared yellow; still less would he dry, rake, and haul it. One of our best collections of short stories by Mary Wilkins, a New England woman farming under difficulties, who, when a weak-minded relative ambles in with a posy of potato blossoms, breaks down in tears, because he has lessened their potato crop.

What such writers say, to quote Matthew Arnold, "is eloquent, is well—but 'tis not true." It may be partly the fault of the readers. We are not critical enough. We laud to the skies an occasional author who "knows Nature like a book," and cite approvingly such passages as "black-budded ash" and "shimmering beech," although they are details simple enough to be included in the nature study outlines of the lower grades. In these days of illustrated "how to know" books there is little excuse for such botanical and agricultural errors.

Such mistakes are rarely mentioned or corrected in print. In the case of the sugar beet, however, there were evidently many protests, for the magazine later published several objections to the rôle assigned the red beet. Two or three of the criticisms parodied the "free verse" of the original, indicating, probably, that the form of the beet sugar poem irritated many of the readers into writing. We have so long thought of poetry as a beautiful form for something worth saying that it is hard to accept much of the new poetry. We *could* stand lack of rhyme, or even the lack of rhythm, but we can't stand it when they have nothing to say. And if the thing itself isn't worth saying, why say it at all, unless it can be well said? Matthew Arnold little thought the time would ever come when *poets* would pride themselves that what they say is *not* eloquent, *not* well, and *not* true.

When Bret Harte rhymed about Rose, he never told her surname, admitting the

Last name tolerable
Only in prose.

Does "Leered 'neath his eyes' ophthalmic eaves"* sound or feel like poetry? The "new poetry" is full of similar offences—bloody chunks of raw meat served up on the table where we were wont to find the food of the gods! Still more annoying are the pages of "fiddling" details, most of them too petty to be a necessary part of the picture presented. Walking from the street gate to the doorstep becomes a Sabbath-day's journey as it is described by Frost, a well-known representative of the "new poetry."

How does a mere botanist dare to object? They are writing for the people—these are democratic days and not one of them would claim to be only—or solely— "a poet's poet"—or the equivalent in prose. Anyhow, they started it—mixing things up until even hemlock trees must think they really *are* responsible for the death of Socrates, and the lower vegetables—beets and potatoes and "sich"—well, they must be "befuddled .quite." If the literary lights don't like our objections, they have two courses open to them: to stop the education of the masses and so eliminate our criticism, or keep out of our garden.

## REVIEWS

### Forests of Worcester County, Massachusetts†

This seems to be the first of a series of county forest reports made for the Massachusetts State Forester, but like other recent publications emanating from that office, it has no series name or number, so that it must be treated by librarians and

* John Masefield.

† Cook, H. O. The forests of Worcester County. The results of a forest survey of the fifty-nine towns in the county and a study of their lumber industry. 88 pp., 7 unnumbered half-tone plates. Boston, 1917.

bibliographers as an independent book. The localities for the illustrations are not given, and as they are not numbered they are not referred to specifically in the text.

Worcester County is the largest in the state (1,565 square miles), and the field work occupied the author and nine students three summers. Each man took one town at a time and ran parallel lines across it half a mile apart, noting the extent of cleared land and each kind of forest traversed, and putting the results on a field map. The forests are divided into seven types and each of those into four size classes.

Of the total area of the county (which had 256 inhabitants per square mile in 1910) 57 per cent was found to be wooded, 21 per cent tilled, 10 per cent open pasture, 5 per cent brush pasture, and the remainder alder swamps, water, settlements, etc. For each town similar data are given, together with notes on wood-using industries, averaging about a page each. Nearly a third of the forest is a comparatively worthless second growth of gray birch, sugar-maple, swamp maple, and an occasional oak. In the better forests white pine and chestnut seem to be the prevailing trees, the former mostly northward and the latter southward.

If the field workers had classified the standing timber by species, which are pretty sharply defined, instead of by forest types, which often grade imperceptibly into one another, it might have added very little to the cost of the survey, and the results would have been more useful, not only to manufacturers who might desire a particular kind of timber for a special purpose, but also to botanists and other scientists.

ROLAND M. HARPER

**Forests of Maryland***

The author, who is the state forester, sums up in this neat quarto volume the results of seven or eight years' work. He had contributed a chapter on forests to the "Plant Life of Maryland," published by the Maryland Weather Service in 1910,†

* Besley, F. W. The forests of Maryland. 152 pp., 17 plates, 23 folded colored maps. Baltimore, "December, 1916." [Published in summer of 1917.] (Previously reviewed by Dr. Fernow in Journal of Forestry **16**: 113–115. "Jan." [Feb.] 1918.)

† Reviewed in Torreya **11**: 36–42. Feb. 1911.

and before that the Maryland Geological Survey had published voluminous reports on the forests of a few counties; but the present publication covers the whole state in a very satisfactory manner, with the thoroughness that has long characterized official scientific work in Maryland. It discusses the history of forest exploitation, present conditions in general and by counties, the species of trees, the principal uses of the forest, the wood-using industries of the state, and various other matters appropriate to an economic report.

For each county the total and relative area of forest, improved land, waste land and salt marsh are given and the forests are further subdivided into mixed hardwoods, pine, and pine and hardwood, each in two degrees of density. There are somewhat similar details also for each of the election districts, averaging about twelve to a county.* The maps, one for each county (one of them covering also the city of Baltimore, which is not a part of any county, and another the District of Columbia), on a scale of three miles to the inch, show the location of all the forests more than a few dozen acres in extent, divided into several types and density classes by means of colors and symbols. It was obviously out of the question to cover the whole state in a single year, and some of the counties were surveyed as long ago as 1907; but the boundaries of wooded areas in Maryland are not changing very fast, so that these maps apply without appreciable error to present conditions. The 30 half-tone illustrations are well chosen, but in most cases the places where the photographs were taken are not indicated, except inferentially by the location of some of the plates among the county descriptions.

Of the total area of the state (which had 130 inhabitants per square mile in 1910) 35 per cent is estimated as forest, 51 per cent as improved farm land, 11 per cent waste land, and 3 per cent marsh. Of the forest 65 per cent is classed as hardwood, 15 per

* The election districts used in the tables (but not shown on the maps) seem to be those outlined on the large county topographic maps published by the state geological survey several years ago; but some additional districts were carved out even before the U. S. census of 1910, so that the forest statistics cannot be completely correlated in these minor details with the population figures of the census.

cent pine, and 20 per cent hardwood and pine mixed. No allowance seems to be made for mountain glades, rocky pastures and urban areas in the land classification, or for conifers other than pine in the forest classification, but the areas occupied by these probably do not much exceed 1 per cent of the total.

The relative amount of forest ranges from 63 per cent in Garrett County, which is the westernmost, highest and rockiest, to 19 per cent in Kent, which is in the fertile green sand marl belt near the head of Chesapeake Bay. Dorchester County is 21 per cent salt marsh, and the area of marsh is said to be increasing, presumably indicating subsidence. If we assume that half the mixed pine and hardwood forest is pine, the proportion of pine in the forests ranges from almost none in some of the Piedmont counties (which have the richest soils), to about two thirds in the three southeasternmost counties (which are rather sandy). The total stand of saw timber (9 inches and over in diameter) in the state is estimated at nearly 4 billion feet, board measure, or about 1,800 feet per acre; and it is apparently being cut faster than it grows.

This report answers almost every question one might reasonably ask about the forest resources of Maryland, except the amount of *any one kind* of timber (for there are many species of hardwood and several of pine, differing considerably in economic properties) in the state or any part thereof. As the work is statistical rather than scientific, it contains very little information about previous literature, geography, soil, climate, etc., but those matters are pretty well covered by other state publications, and this one will be a great help to any one who may hereafter wish to classify the forests by regions and determine the relative abundance of the several species of trees and correlate them with environmental factors.

Roland M. Harper

**Murrill's and Saccardo's Names of Polypores Compared***

The object of this pamphlet, as stated by the author, is to provide parallel lists of synonyms, so that one may readily find the

* By W. A. Murrill, Bronxwood Park, New York City. Pp. 1–31. Published by the author, March, 1918. Price $0.35.

equivalent of any recognized name of a Polypore in either system.

Two such lists are given: first, Murrill's names, arranged alphabetically, with the Saccardo synonyms alongside; second, Saccardo's, also arranged alphabetically, with Murrill's names compared in an opposite column.

Mycologists will find these lists both convenient as well as necessary to the clear understanding of the many recent changes in the nomenclature of the Polypores. It may be of interest to note that the Murrill list shows 71 genera; while the corresponding species in Saccardo are arranged in only 20 genera.

E. W. Olive

## PROCEEDINGS OF THE CLUB

### March 12, 1918

The meeting was held at the American Museum of Natural History at 8:15 P.M. President Richards presided. There were thirty-three persons present.

The regular order of business was dispensed with.

The announced scientific program consisted of a lecture on "Ferns" by Dr. Ralph C. Benedict. The lecture was illustrated by many colored lantern slides.

Adjournment followed.

B. O. Dodge,
*Secretary*

### March 27, 1918

The meeting was held in the lecture room of the Department of Botany, Columbia University. President Richards called the meeting to order at 3:30 P.M. There were thirty-five persons present.

The minutes of the meetings held February 27 and March 12 were approved.

The following persons were nominated for membership: Miss Maude Lovering, 430 West 118th Street; Miss Rosa Ostertag, 174 Bond Street, Brooklyn; Dr. Paul Weatherwax, University of Indiana, Bloomington, Indiana; and Mr. Eugene Brennan, 2003 Indiana Avenue, Chicago, Ill.

The resignation of Mrs. Wanda Kirkbride Farr was read and accepted. The election of Miss Maude Lovering, Miss Rosa Ostertag, Dr. Paul Weatherwax and Mr. Eugene Brennan followed.

The President appointed J. F. Adams and B. O. Dodge to serve on the committee on Crop Protection of which Dr. E. W. Olive is chairman.

The announced scientific program consisted of a lecture on "A Botanical Excursion in Colombia" by Professor H. H. Rusby. The lecture was illustrated by lantern slides. The following abstract was furnished by the speaker.

"Dr. Rusby carried his audience up the valley of the Magdalena River to the head of steamboat navigation, describing the broad savannah lands which stretch away to the mountains on either side, in the lower valley, and the gradual entrance into the hill country, and then into the mountainous region higher up. The savannahs are covered with luxuriant pasture grasses and support an important grazing industry. In the moist places are seen colonies of pampas grass, twenty feet or more in height and highly ornamental. Colonies of trees and shrubs, largely Mimosaceae, and frequently Palmae, dot the plains and fringe the banks of the river. Many herbaceous and shrubby flowering vines support themselves upon these shrubs and trees. Above, the savannahs gradually give place to forests, which at length become very heavy. Close to the water occurs a growth of Cecropias of several species. Back of these are Ceibas, some of them of great size. Still farther back is a highly diversified forest growth growing richer as the mountain regions are encountered. At the head of steamboat navigation, travel by mule is substituted, the route passing through a great variety of soil, climatic and altitudinal conditions. Arid plains are of great extent and upon one of them occurs a large petrified forest, very similar to those of Arizona. Climbing the mountain slope, the traveller passes through all climatic belts to the limit of forest growth, but in this locality does not encounter glacier conditions. At one point the forest growth appears quite temperate in character, comprising oaks, walnuts, Ericaceae and Vacciniaceae, blackberries, raspberries and strawberries.

"Many of the subjects were illustrated by lantern slides from original photographs, some of the latter also being taken from negatives loaned by the American Museum of Natural History.

"The forthcoming volume of the *Memoirs* of the Club will contain an extended acount of the floral features of the region traversed."

Adjournment followed.

B. O. Dodge,
*Secretary*

## NEWS ITEMS

In the death of C. K. Dodge, of Port Huron, Michigan, systematic botany in this country has suffered a decided loss. Mr. Dodge was one of the older school of botanists who believed in making extensive collections of plants, and in giving an intensive study to the flora of different regions. He is known to many of the specialists in various groups because of his large collections, which he was always ready to lend to those who were making a study of any important family or genus.

Charles Keene Dodge was born April 26, 1844, on a farm five miles north of the city of Jackson, Michigan. He attended country and city school, and in 1865 went to Ann Arbor, where he attended the Union School for one year, entering the University of Michigan in the fall of 1866. He pursued a classical course and graduated in 1870. He taught school in Rockland, Michigan, and Hancock, Michigan, each two years, and then studied law and was admitted to the bar in 1875. He settled in Port Huron in that year and practiced law until 1893, when he was appointed Deputy U. S. Customs Inspector, a position which he held until his death.

His greatest interest in botany dated back to shortly after the completion of his university course, although he was interested in plants even as a boy. One of the reasons that he gave up the practice of law and accepted the Customs Office position was that it would give him more time for the study of his beloved collections, so that we find that his botanical publications mostly fall in the last twenty-five years of his life.

Mr. Dodge was a member of the Sons of the American Revolution, of the Michigan Academy of Science, and of other scientific organizations.

Among his publications are the following: The Flowering Plants, Ferns, and Fern Allies growing without Cultivation in Lambton County, Ontario, 16th Report, Michigan Academy of Science, 1914; Annotated List of the Flowering Plants and Ferns of Point Pelee, Ontario, and Neighboring Districts, Canada Department of Mines, Memoir 54, No. 2, Biological Series, 1914; Observations on the Collection and Study of Crataegi in the Vicinity of Port Huron, Michigan, 9th Report, Michigan Academy of Science, 123–125, 1907; A Botanical Trip to Thunder Bay Island, 10th Report, Michigan Academy of Science, 40–41, 1908. Results of the Mershon Expedition to the Charity Islands, Lake Huron, Plants, 13th Report, Michigan Academy of Science, 173–190, 1911; The Flowering Plants, Ferns, and Allies, of Mackinaw Island, 15th Report, Michigan Academy of Science, 1913; Flora of St. Clair Co., Michigan, and the Western Part of Lambton County, Ontario, published by the Michigan Horticultural Society, 1899. (*Ernst Bessey.*)

Mr. Oliver Atkins Farwell for twenty-six years curator of the herbarium and drug inspector for the well known firm of manufacturing chemists, Parke, Davis & Company, has recently been appointed Instructor of Botany at the Detroit College of Pharmacy in place of Mr. Blome, who resigned.

Volume seventeen of the *Memoirs* of the Club, consisting of 496 pages, was issued 10 June. These contain the proceedings of the Semi-Centennial Anniversary of the Club held October 18, 19 and 20, 1917, which besides historical matter and reminiscences, consists of over 25 scientific papers read at that celebration.

# The Torrey Botanical Club

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Hymenomycetes: W. A. Murrill
Except Russula and Lactarius: Miss G. Burlingham
Cortinarius: R. A. Harper
Polyporeae: M. Levine
Exobasidii: H. M. Richards
Rusts and Smuts: E. W. Olive
Discomycetes: B. O. Dodge
Lichens: W. C. Barbour
Sphaeriaceae, Dothideaceae: H. M. Richards
Hypocreaceae, Perisporieae, Plectascineae, Tuberineae: F. J. Seaver
Fungi-forming sclerotia: A. B. Stout
Imperfecti: H. M. Richards, F. Seaver, Mel T. Cook
Oomycetes: C. A. King
Zygomycetes: A. F. Blakeslee
Chytridiaceae,
Myxomycetes: Mrs. H. M. Richards
Yeast and Bacteria: Prof. J. Broadhurst
Insect galls: Mel T. Cook

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New York City

Vol. 18 July, 1918 No. 7

# TORREYA

A MONTHLY JOURNAL OF BOTANICAL NOTES AND NEWS

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873.

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# THE TORREY BOTANICAL CLUB




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Brooklyn, N. Y

# TORREYA

July, 1918

Vol. 18 No. 7


## THE FLORA OF INDIAN LADDER AND VICINITY; TOGETHER WITH DESCRIPTIVE NOTES ON THE SCENERY

By Stewart H. Burnham

(*Continued from June* Torreya)

July 21, 1907. We left the city on the morning train. Fields and banks near Delmar bright with rabbit-foot clover and black-eyed Susans. Visited Tory House, and from thence along the brow of the cliffs to Helmus Crack and Hailes' Cavern. The cave is being enlarged at the entrance, and one can walk in without stooping much, although a considerable stream of water is flowing from it to-day. The station for *Placodium elegans* (Link) Ach. has been destroyed. Prof. John H. Cook, whom we met, told us that he found, when exploring the cave a year ago, that one could go about 3,000 feet, and that the last 1,600 feet one was obliged to hitch along on one side. It extends farther, but had fallen in. Hailes measured it off inaccurately with a pedometer (not being able to walk) 2½ miles, but the real distance is less than three fifths of a mile.

Returning, we took the path along the base of the cliffs past the waterfalls, both of which were fine to-day, on account of a heavy thunder shower in this section last evening, which filled the streams from bank to bank. There is much spray about the waterfalls, and a growing rainbow near the foot of Mine Lot Fall. After resting on Table Rock, we proceeded to East Cliff, past a temporary camp on the brow of the old man's face. On the way, in the woods, we found *Erineum* galls on the leaves of *Quercus rubra* L. and *Acer Saccharum* Marsh. The linden, *Tilia*

[No. 6, Vol. 18 of Torreya, comprising pp. 101–126, was issued 8 July 1918.]

*americana* L., trees are beginning to open their fragrant yellowish green flowers. A week ago there was no water in the stream by Washburn's cottage, but to-day it is full banked and falling to the Fallen Rocks.

Resting again at the flag pole, we then descended the short cut trail to the base of the cliff, and then struck northward through a raspberry thicket and over fallen logs. On entering the woods, one finds the Bear path without trouble, although the trail is fairly well beaten; but few venture here. It is a walk of about one fourth of a mile to Fallen Rocks, and on the way one passes "Sentinel Rock." The path is edged with lovely mosses and ferns, wall rue in great abundance, the graceful fronds of the bladder fern, three feet long, fronds of the slender cliff-brake, nearly a foot long, the walking fern and the purple cliff-brake higher on the cliffs. Rock polypody is not so very common and is usually seen along the brow of the upper cliff.

The Bridal Veil and the talus slope of "Fallen Rocks" is one of the grandest spots yet seen in the Helderbergs. The scenery and picturesqueness of the place has but few equals in the capital district of the Empire State. The last great fall of rock was about 1830 or 1834, causing a considerable earth jar and dust to fill the air for two or three days. Here one of the camps of other days is called "Elverslide," near the mouth of a large fault cavern, turning abruptly at right angles, through which one can pass and scramble. Overhead are immense rocks caught in the fault. The giant "Monolith" is a huge upright rock, 75 feet high, standing on a pedestal, a very few feet from the side of the cliff. Late in the afternoon we descended the talus slope to a deep fern glade, shaded by canoe birch and other deciduous trees.

The following plants were observed or collected: *Peltigera horizontalis* (L.) Hoffm.

*Brachythecium rutabulum* (L.) B. & S.; *Bryum intermedium* Brid.; *Campylium chrysophyllum* (Brid.) Bryhn; *Encalypta streptocarpa* Hedw.; *Gymnostomum curvirostre* (Ehrh.) Hedw., foot of Mine Lot, forming a fine calcareous tufa; *Mnium spinulosum* B. & S.; *Orthotrichum anomalum* Hedw. on rocks; *Rhodo-*

Fig. 6. Table Rock at the crest of Mine Lot Fall, looking into the main amphitheatre.

*bryum roseum* (Weis.) Limpr.; and *Thuidium abietinum* (L.) B. & S., not rare along the brow of the cliffs.

*Agropyrum caninum* (L.) R. & S.; *Carex eburnea* Boott; *Circaea lutetiana* L. with the rust *Puccinia Circaeae* Pers. attacking the leaves.

October 26, 1907. An afternoon at Indian Ladder; very pleasant and cool out of doors, and the autumn leaves falling. But little water in Black creek: and ice beginning to form at the base of the waterfalls. Near the head of Indian Ladder road found *Dermatocarpon miniatum* (L.) Fr. on the cliffs.

*Chenopodium hybridum* L.; and *Cerastium arvense* L. in flower.

May 16, 1908. To the Helderbergs in the afternoon. Dandelions yellowing the hills in the valley. The *Equisetum fluviatile* L., about one half grown, in wet places near Voorheesville. The Bridal Veil Fall very beautiful and flimsy. The breaking away of the rocks, during the past winter, from the cliffs, in several places is quite noticeable; and a small landslide has taken out some of the short cut trail from East Cliff.

Collected and observed: *Gymnosporangium clavariaeforme* (Jacq.) DC. on *Juniperus sibirica*.

*Collema pulposum* (Bernh.) Ach. on earth; and *Parmelia cetrata* Ach. on trunks of *Juglans cinerea* L.

*Bartramia Oederi* (Gunn.) Swtz. and *Mnium affine ciliare* (Grev.) CM.

*Botrychium virginianum* (L.) Sw.

*Carex platyphylla* Carey; *Arisaema triphyllum* (L.) Torr.; *Trillium erectum* L., one plant with a sessile flower; *Uvularia grandiflora* J. E. Sm.; *Actaea rubra* (Ait.) Willd.; *Mitella diphylla* L.; *Waldsteinia fragarioides* (Mx.) Tratt., with flowers as bright yellow as the yellow violet; *Polygala paucifolia* Willd.; *Viola canadensis* L.; *Viola conspersa* Reichenb.; *Vaccinium angustifolium* Ait. (*V. pennsylvanicum* Lam.) and *Antennaria plantaginifolia* (L.) Richards.

June 7, 1908. Left the city on the morning train. Near Voorheesville saw *Iris versicolor* L.; *Nymphaea advena* Soland, in wet pools; *Kalmia angustifolia* L. and *Lysimachia quadrifolia* L. Along the railroad track at Voorheesville *Bromus tectorum* L.; *Convolvulus arvensis* L. and *Galium Mollugo* L.

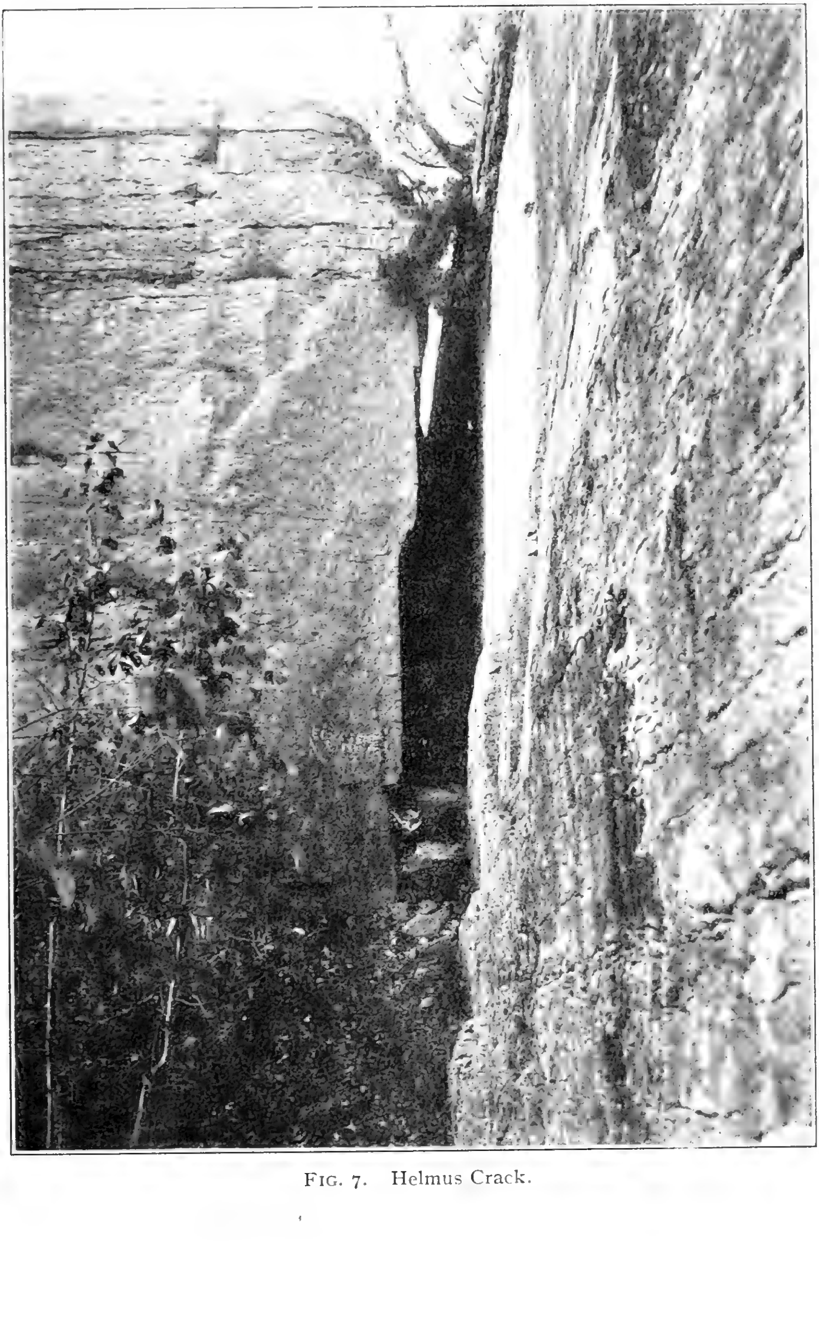

FIG. 7. Helmus Crack.

I had intended to have gone to the base of Bridal Veil, but found the swampy woods about a mile southeast of Meadowdale so interesting that I spent about five hours reading beside a fine spring, with a smudge fire to keep the mosquitoes partly off. What is more delightful than to breathe the smoke of an outdoor fire, and to watch it circle through the trees? A half rock fire-place was built; and on a fire was laid a few moist pieces of wood. Hermit thrushes, blue jays, crows and many other birds.

Visited an old forsaken house, wood-colored and with a long, low shingle roof. Meadows stand high with grass. Several ripe strawberries. While at the spring a man came for water, and later a foreign woman, barefoot, who could not speak much English. I am told that floods in the spring are partly the cause of the embankment along the lower course of Black creek. The boulders form a bank four or five feet high, especially along the bank, opposite the sharp angle of the stream.

A fine lot of *Cypripedium reginae* Walt., flowering three weeks earlier than last season, was found in the swamp woods. Much *Toxicodendron vernix* (L.) Ktze. grows in this swamp, but to neither poison sumac or poison ivy am I susceptible. Twenty plants of the showy lady's-slipper were brought back to the city, and I was poisoned, by the volatile oil from the hairs, on the wrists of both arms, as it was a warm day. The poison was troublesome for about a week, and relieved in part by applications of strong alcohol. Miss Alice E. Bacon in Rhodora 4: 94–97. May 1902 gives a good account of *Cypripedium* poisoning; also in Vt. Bot. Club Bull. 4: 13–14. April 1909.

Along the roadside and in dry fields about a mile southeast of Meadowdale the following plants: *Pinus rigida* Mill.; *Carex straminea* Willd.; *Unifolium canadense* (Desf.) Greene; *Comandra umbellata* (L.) Nutt.; *Arenaria serpyllifolia* L.; *Rosa rubiginosa* L.; *Vitis vulpina* L.; *Cornus Amomum* Mill.; *Cornus femina* Mill. (*C. candidissima* Marsh.); flowering dogwood, *Cynoxylon floridum* (L.) Raf.; *Gaylussacia baccata* (Wang.) C. Koch (*G. resinosa* (Ait.) T. & G.); *Polycodium stamineum* (L.) Greene, not rare; *Lysimachia quadrifolia* L.; *Convolvulus spithamaeus* L.; *Diervilla Diervilla* (L.) MacM.; and in a meadow *Hieracium aurantiacum* L. and *Hieracium florentinum* All.

In a very wet bog on the west side of the road, with a small spot of sphagnum. *Calla palustris* L. and *Sarracenia purpurea* L. Under the white pine trees about the bog, *Coptis trifolia* (L.) Salisb. and *Linnaea americana* Forbes.

In the partly overgrown swamp on east side of the road, which contains but little sphagnum. *Calypogeia Trichomanis* (L.) Cda. and *Cephalozia pleniceps* (Aust.) Lindb., at the base of a tamarac, determined by Miss Annie Lorenz; *Lophocolea heterophylla* (Schrad.) Dum. on old logs, determined by Miss Lorenz; *Ptilidium pulcherrimum* (Web.) Hampe on coniferous wood; and *Trichocolea tomentella* (Ehrh.) Dum.

*Amblystegium varium* (Hedw.) Lindb.; *Brachythecium rivulare* B. & S.; *Campylium stellatum* (Schreb.) Bryhn; *Hypnum Haldanianum* Grev. on old logs, determined by Miss E. A. Warner; *Hypnum recurvans* (Mx.) Schwaegr.; *Mnium punctatum* L. and *Sphagnum magellanicum* Brid.

*Osmunda cinnamomea* L.; *Dryopteris thelypteris* (L.) A. Gray and *Pteridium aquilinum* (L.) Kuhn.

*Larix laricina* (DuRoi) Koch; *Taxus canadensis* Marsh.; *Carex diandra* Schrank. (*C. teretiuscula* Gooden.); *Carex flava* L.; *Carex hystricina* Muhl.; *Carex leptalea* Wahl.; *Carex platyphylla* Carey in dry soil; *Carex stipata* Muhl.; *Carex stricta* Lam.; *Eriophorum viridicarinatum* (Engelm.) Fernald; *Spathyema foetida* (L.) Raf.; *Vagnera stellata* (L.) Morong; *Limodorum tuberosum* L.; two plants of white adder's mouth, *Malaxis monophylla* (L.) Sw.; *Alnus rugosa* (DuRoi) K. Koch; *Caltha palustris* L.; *Drosera rotundifolia* L.; *Benzoin aestivale* (L.) Nees; *Chrysosplenium americanum* Schwein.; *Mitella nuda* L.; *Grossularia hirtella* (Mx.) Spach (*Ribes oxyacanthoides* of Am. auth.); *Rubus nigrobaccus* Bailey; *Rubus procumbens* Muhl. in dry soil; *Rubus triflorus* Richards.; *Amelanchier canadensis* (L.) Medic; *Amelanchier intermedia* Spach; *Aronia arbutifolia* (L.) Ell.; *Aronia melanocarpa* (Mx.) Britton; *Acer spicatum* Lam.; *Rhamnus alnifolia* L'Her.; *Viola cucullata* Ait.; *Aralia nudicaulis* L.; *Aralia racemosa* L.; dwarf cornel, *Chamaepericlymenum canadense* (L.) Asch. & Graeb.; *Gaultheria procumbens* L.; *Xolisma ligustrina* (L.) Britton; *Gaylussacia baccata* (Wang.) C. Koch;

*Vaccinium atrococcum* (A. Gray) Heller; *Vaccinium corymbosum* L.; *Naumburgia thrysiflora* (L.) Duby; *Menyanthes trifoliata* L.; *Veronica americana* Schwein.; *Lonicera canadensis* Marsh.; *Lonicera dioica* L.; *Viburnum dentatum* L.; *Petasites palmata* (Ait.) Gray and *Solidago patula* Muhl.

June 21, 1908. We left for Indian Ladder on the morning train. Most of the streams were dry, and only water at Mine Lot Fall. We went into Hailes' Cavern past the elbow, where one can stand erect. The calcareous rocks show decidedly the smoothing and polishing by water. The boat, which was lowered from the brow of the cliff a year or two ago, was stored under the roof of the cavern, near the entrance. Since the opening has been enlarged, and the channel of the stream from the cave deepened at the mouth four or five feet there can be but little water here now, except during continued rains or the early spring. Some of the natural beauty of the spot has been destroyed forever. The bladder fern is very fine this season, the long tapering fronds standing almost upright at openings at the base of the cliffs.

Collected and observed the following: *Leptothryium Periclymeni* (Desm.) Sacc. on leaves of *Lonicera canadensis*, and *Sorosporium Saponariae* Rud., deforming the flower clusters of *Cerastium arvense*, verified by Dr. G. P. Clinton and only reported previously in America by Prof. A. O. Garrett on *Silene Menziesii* in Utah; a portion of the collection was deposited in the State Herbarium.

*Hygrohypnum palustre* (Huds.) Loeske, on wet rocks at base of Mine Lot, determined by Miss Warner and Dr. G. N. Best; and *Hypnum imponens* Hedw.

*Filix fragilis* (L.) Underw.

*Arenaria serpyllifolia* L.; *Arenaria stricta* Mx.; *Anemone riparia* Fernald, dry rocky soil; *Sassafras Sassafras* (L.) Karst., pasture below Fallen Rocks; *Fragaria americana* (Porter) Britton; *Rosa virginiana* Mill.; *Apocynum hypericifolium* Ait. along stream; *Lappula virginiana* (L.) Greene, depauperate and with bluish-white flowers, foot of Bridal Veil Fall; and *Pentstemon hirsutus* (L.) Willd.

July 18, 1908. To Meadowdale for the afternoon. *Castalia odorata* (Dryand.) Woodv. & Wood, in shallow water and smaller pools than usual; and *Asclepias incarnata* L. along the railroad Voorheesville to Meadowdale.

Visited the bog on the right-hand side of the road up the little hill about a mile southeast of Meadowdale. This bog, designated as (No. 1)—"Woodwardia bog"—was dry enough to get on; although it was surrounded by water and ooze a few weeks ago. Crossing the fields towards Indian Ladder, one reaches the road bearing in the direction of Countryman Hill; one passes two or three houses, and on the left-hand side of the road, at the edge of the woods is a bog, designated as (No. 2)—"Swamp Loosestrife bog." It covers an area of five or six acres and is wet and springy, and I was only able to get on it by using two fence boards. One could not remain long in one spot, for soon the water would cover the boards. Drank from a spring under the shadow of Fallen Rocks. There is no water in any of the falls to-day, unless it be Mine Lot.

The following plants were observed or collected: *Didymium xanthopus* (Ditm.) Fr. on sphagnum, mosses and old leaves.

*Biatora sanguineoatra* (Ach.) Tuck., on mosses and rotten stumps.

*Cephalozia pleniceps* (Aust.) Lindb.; *Lophocolea heterophylla* (Schrad.) Dum. and *Plagiochila asplenoides* (L.) Dum., all determined by Miss Lorenz; and *Ptilidium pulcherrimum* (Web.) Hampe.

*Aulacomnium palustre* Schwaegr.; *Calliergon cordifolium* (Hedw.) Kindb.; *Georgia pellucida* (L.) Rabenh. on old logs and stumps; *Hypnum Haldanianum* Grev.; *Hypnum recurvans* (Mx.) Schwaegr. on old logs; *Plagiothecium denticulatum* (L.) B. & S.; *Sphagnum squarrosum* Crome and four undetermined *Sphagnums.*

*Osmunda cinnamomea* L.; and woodwardia, *Anchistea virginica* (L.) Presl., abundant in (No. 1).

*Larix laricina* (DuRoi) Koch; *Scheuchzeria palustris* L.; *Carex diandra* Schrank. (No. 1); *Dulichium arundinaceum* (L.) Britton; *Eriophorum tenellum* Nutt. (No. 2); *Mariscus mariscoides* (Muhl.) Ktze. (*Cladium mariscoides* (Muhl.) Torr.); *Rynchospora alba*

(L.) Vahl; *Peltandra virginica* (L.) Kunth; *Eriocaulon septangulare* With. (No. 2); *Betula lutea* Mx. f.; *Quercus coccinea* Wang. and *Quercus Prinus* L. in dry woods; *Nymphaea advena* Soland. (No. 2); *Drosera intermedia* Hayne, abundant at (No. 2); *Ribes vulgare* Lam., a plant in the woods at (No. 2); *Aronia arbutifolia* (L.) Ell. (No. 2), not as common as *Aronia melanocarpa* (Mx.) Britton; *Trifolium arvense* L., dry fields; *Ilex verticillata* (L.) A. Gray; *Nemopanthes mucronata* (L.) Trelease; *Triadenum virginicum* (L.) Raf., and a broader leaved form at (No. 1); *Decodon verticillatus* (L.) Ell., very abundant at (No. 2); lovage, *Hipposelinum Levisticum* (L.) Britton & Rose, escaped to roadside; *Azalea canescens* Mx.; *Chamaedaphne calyculata* (L.) Moench; *Kalmia angustifolia* L.; *Gaylussacia baccata* (Wang.) K. Koch; *Oxycoccus macrocarpus* (Ait.) Pursh, abundant at (No. 2), one form with leaves 13 x 7 mm., another form with leaves more crowded and 10 x 5 mm.; *Oxycoccus Oxycoccus* (L.) MacM. (No. 1); *Vaccinium atrococcum* (A. Gray) Heller, common specially at (No. 1) and heavily fruited; *Vaccinium corymbosum* L., not as common as the last and fruiting a little later; *Dasystoma flava* (L.) Wood, woods about (No. 2); *Melampyrum lineare* Lam.; *Cephalanthus occidentalis* L.; *Viburnum cassinoides* L. at (No. 2) —two forms, the leaves in one 7½ x ¾–1¼ cm., the leaves in the other form 5 x 2 cm. more crenulate and acute; *Viburnum dentatum* L.; *Anaphalis margaritacea* (L.) B. & H., fields; *Rudbeckia hirta tubuliforme* Burnham, roadside.

August 29, 1908. Indian Ladder in the afternoon. Up Black Creek above Tory Hook and about two thirds the distance to the foot of Mine Lot Fall. On the stream embankments a fine growth of maidenhair and evergreen shield ferns. The embankments are five to ten feet high and rather regular in outline; can they be actually formed by the high water bringing down soil, rocks and debris? There are a few hemlocks on Tory Hook at the site of a camp. On leaving the rugged rocky bed of the stream, one passes through a low shrubby hemlock growth, until the Bear path under the old man's face is reached. Found the trail much better beaten than I expected, but affording few views. A wealth of pale touch-me-not along the cliff path for half a mile, crowding out all other vegetation, and a fine sight. Returned through Glen Doon and in the woods further down found a fine specimen of Jack-my-lantern fungus, *Clitocybe illudens* (Schw.) Sacc., at the base of a hickory stump. One clump had over 50 plants; which I succeeded in taking to the city and presenting to the State Museum. The gills gave off a decided phosphorescent glow in the dark of the room, so one could read very coarse print.

The following plants were seen or collected: *Lycogala epidendrum* (Buxb.) Fr. on basswood logs.

*Agaricus placomyces* Pk.; *Amanitopsis vaginata* (Bull.) P. Karst., the var. *livida* (Pers.) Pk.; *Boletus granulatus* L.; *Boletus scaber* Bull.; *Calvatia gigantea* (Batsch); *Clavaria aurea* Schaeff.; *Clavaria pistillaris* L.; *Collybia radicata* (Relh.) Quel.; *Crepidotus malachius* (B. & C.) Sacc.; *Eutypella cerviculata* (Fr.) Sacc. on *Carpinus carolinana; Fomes ignarius* (L.) Gill. on *Carpinus* and butternut; *Helvella crispa* (Scop.) Fr.; *Hydnum albonigrum* Pk.; *Hydnum coralloides* Scop.; *Hygrophorus conicus* (Scop.) Fr.; *Hypoxylon multiforme* Fr. on canoe birch; *Laccaria laccata* (Scop.) Berk. & Br.; *Lactarius parvus* Pk. on rotten log; *Lactarius piperatus* (L.) Pers.; *Lactarius trivialis* (Fr.) Fr.; *Lactarius uvidus* (Fr.) Fr.; *Lactarius vellereus* (Fr.) Fr.; *Lactarius volemus* (Fr.) Fr.; *Leotia lubrica* (Scop.) Pers.; *Lepiota aspera* (Pers.) Quel.; *Macropodia fuscicarpa* (Ger.) Durand; *Mycena leaiana* Berk.; *Omphalia Austini* (Pk.) Sacc.; *Panus stipticus* (Bull.) Fr. on yellow birch; *Paxillus involutus* (Batsch) Fr.; *Pluteus tomentosulus* Pk.; *Polyporus cuticularis* (Bull.) Fr. on beech; *Polyporus gilvus* (Schw.) Fr. on birch; *Russula foetida* (Pers.) Fr.; *Sebacina incrustans* (Pers.) Tul.; *Urocystis Anemones* (Pers.) Wint. on leaves of *Hepatica acutiloba; Uromyces Caladii* (Schw.) Farl. on leaves and spathes of *Arisaema triphyllum.*

*Conocephalum conicum* (L.) Dum. and *Marchantia polymorpha* L.

*Aulacomnium heterostichum* (Hedw.) B. & S.; *Bartramia pomiformis* (L.) Hedw.; *Hylocomium proliferum* (L.) Lindb. and *Hylocomium triquetrum* (L.) B. & S.

*Oryzopsis racemosa* (J. E. Sm.) Ricker (*O. melanocarpa* Muhl.);

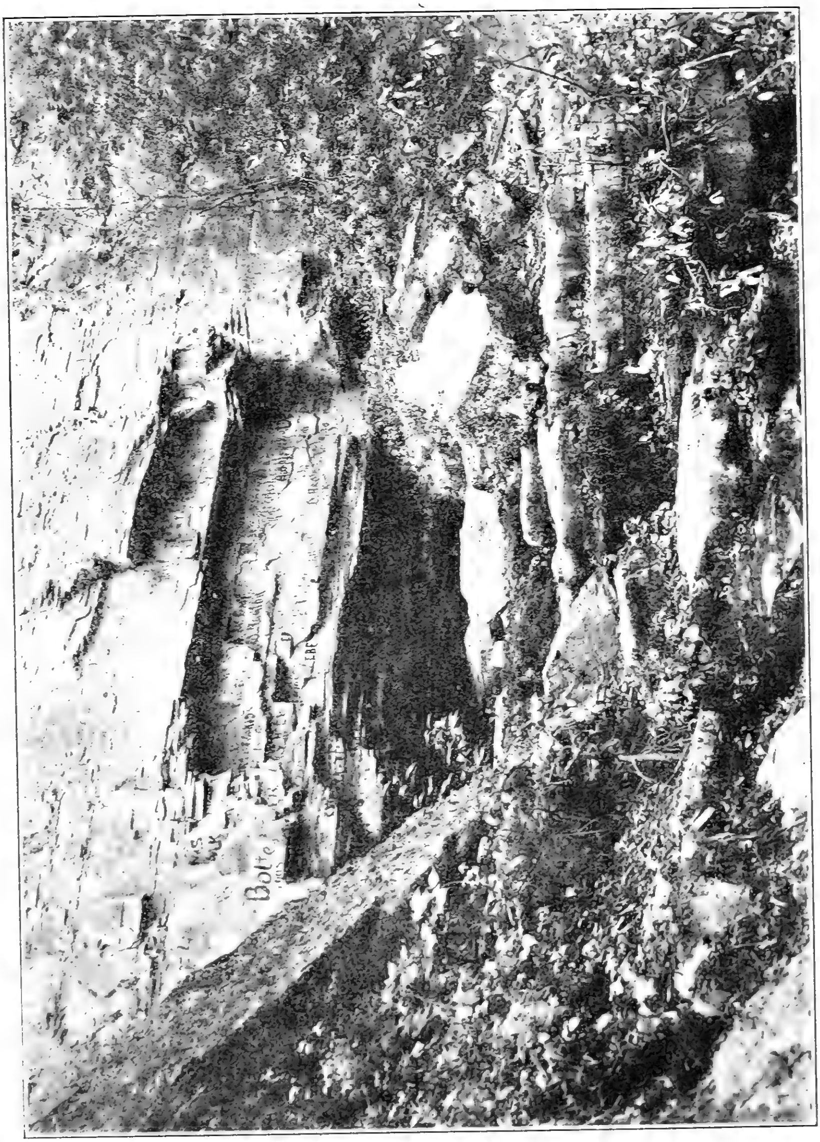

Fig. 8. Mouth of Hailes' Cavern before the stream bed was disturbed.

*Allium tricoccum* Ait.; *Unifolium canadense* (Desf.) Greene; *Corallorrhiza maculata* Raf. (*C. multiflora* Nutt.); *Corallorrhiza odontorhiza* (Willd.) Nutt.; *Adlumia fungosa* (Ait.) Greene; *Bicuculla canadensis* (Goldie) Millsp., abundant below the ruined tower; *Impatiens biflora* Walt., not near as common as *Impatiens pallida* Nutt.; *Epilobium adenocaulon* Haussk.; *Lappula virginiana* (L.) Greene, one small plant of the cliff form; *Collinsonia canadensis* L. and *Helianthus decapetalus* L.

November 3, 1908. Indian Ladder most of the day. Glen Doon and Black creek amphitheatres in an Indian Summer's haze. It was very mild in the bright sunshine. Visited the grave of

CHRISTOPHER VANWALKENBURG
DIED
OCT. 11, 1816
AE 30 Y'RS — MO.
& 21 DAYS.

There were two or three other graves that formerly had marble slabs; and several graves were marked by stones from walls. The little knoll on which these graves lie is about a mile from the railroad station, on the private road.

Crossed the field to the stream from Hailes' Cavern, which has worn its bed through Hudson River shale, around a considerable hill, at right angles to it. For some distance upstream, flowing water, until one came to the confluence of the streams. Scarcely any water in the stream from the cavern, and the other stream must issue from under the rocks, a short distance above, for no water falls over the cliffs at the head of the gulf. Indeed this would only be a waterfall during very high water, but the boulder-strewn way indicates a stream bed. In the valley the embankments of rocks along the stream I suspect have been left during high water. The climb to Hailes' Cavern is very steep and obstructed with large rocks, and from the cavern to the head of the western amphitheater there is no perceptible trail along the base of the cliffs. There are many cavern-like openings and shelves, and in one spot a green carpet of ground hemlock, *Taxus canadensis* Marsh. Some of the rocks are green with mats of *Anomodon attenuatus* (Schreb.) Hueben, and one sees along the cliffs the old-fashioned motherwort and catnip. From the head of this amphitheater to the Indian Ladder road, there is a very good trail at the base of the cliffs, and the character of the cliffs of the western exposure here, as along the East Cliff, is more fossiliferous. More hemlock, *Tsuga canadensis* (L.) Carr., abound, surrounded by groves of canoe birch. *Pellaea atropurpurea* (L.) Link occurs here, as along the western exposure of East Cliff. There is a peculiar rock column, a dozen feet high, along the trail, in close proximity with the cliff, and with space enough for a person to pass between the column and the cliff. One comes out at Tory House and the genuine wildness of the path is lost.

Along the trail in the west amphitheater a dead robin (perhaps shot), and within a short distance a dead cottontail. Can bunny have met his fate, during the night or when pressed or pursued, leaping from the cliffs? I could find no signs of it having been shot. Partridges, blue jays, chickadees, crows, a red-headed woodpecker, red squirrels, flies and a cricket singing his parting song. Down in the valley a hound baying.

> "Hark! hear the sound of the baying hound!
> Along the round of the mountain;
> The echo calls, then it falls and falls
> Like the water of a fountain.
> Oh, mournfully sad and strange and deep
> The voice of the hound along the steep."

There was no water in Little Fall and but a small amount in Mine Lot, although ice was beginning to form at the base of the fall, noticeable from the valley. But few leaves left on the trees, dried, browned and bronzed. Near the site of the wooden ladder beyond Mine Lot, the hemlocks form a V into a fine growth of canoe birch. Can the formations and distribution of the birch and hemlock be due to soil conditions?

The following plants were seen or collected: *Daldinia concentrica* (Bolt.) Ces. & DeNot. on old logs; *Fomes applanatus* (Pers.) Wallr. on living maple; *Hymenochaete tabacina* (Sow.) Lev. on hickory and *Ostrya virginiana; Julella monosperma* (Pk.) Sacc. on a rotten log in west amphitheater with *Lophocolea hetero-*

*phylla* (Schrad.) Dum.; *Pholiota adiposa* Fr. and *Pholiota autumnalis* Pk. on old logs.

*Cladonia rangiferina* (L.) Weber.

*Brachythecium oxycladon* (Brid.) J. & S.; *Calliergon Schreberi* (Willd.) Grout; *Dicranum scoparium* (L.) Hedw.; and *Plagiothecium turfaceum* Lindb. on logs.

*Asplenium Ruta-muraria* L.; *Asplenium Trichomanes* L., one plant, not a common fern; *Polypodium vulgare* L., although not rare along the brow of western cliffs in scattered stations, yet it cannot be considered as common as would be expected.

The following plants in flower: *Alsine media* L.; *Hamamelis virginiana* L.; *Melilotus officinalis* (L.) Lam.; *Trifolium agrarium* L.; *Robertiella Robertiana* (L.) Hanks; *Aster cordifolius* L.; *Aster ericoides* L. and *Solidago caesia* L. The Herb Robert plentiful along the cliffs and "in varicolored prettiness." Delightfully fragrant when touched and the green at this season of the year variegated with crimson and yellow.

*Juniperus virginiana* L., a completely prostrate shrub; *Carex eburnea* Boott; *Vagnera stellata* (L.) Morong, path near Hailes' Cavern; *Arenaria stricta* Mx., along the Bear path above Indian Ladder road; *Atragene americana* Sims; *Celastrus scandens* L.; *Staphylea trifolia* L.; *Cornus rugosa* Lam., forming thickets and *Lonicera hirsuta* Eaton.

February 22, 1909. We left the city on an early morning train and spent the day at Indian Ladder. We found the climb very slippery up the carriage road and along the base of the cliffs. We were obliged to cling to every tree, shrub and log and there was considerable danger, although we returned with only very wet feet. The snow was so crusted one could make but little impression in it, but it was softer and deeper in the wooded valley. It took us an hour to go from Little to Mine Lot Fall; which ordinarily would take less than ten minutes, and we had to creep and crawl far below the Bear path.

It is not so difficult to reach the Little Fall, where the water falls into an immense ice conduit, reaching to the top of the cliff 80 feet above. It was a beautiful sight and several large stalactite icicles hang pendant from the cliff near by. One can pass in safety along the path behind this cone, as at Mine Lot.

We found enough wood for a good fire at Mine Lot Fall, where we lunched and rested for two hours in the Red Paint Mine. The ice cone here is not so large but is greater in diameter than at Little Fall, and the hundreds of diamonds—"ice buttons"—are very beautiful. The roughness of the ice gives one an opportunity to approach the edge of the cone and look down the ice-encrusted ravine. Further progress along the path was blocked by ice, and we descended through the woods on the ridge between the streams from the two waterfalls.

Mosses, bright and green but frozen, and bittersweet berries. Over the hemlocks, birches and maples of the ravine, to the north of Meadowdale is a "flood lake" of the form of an interrogation point. Red squirrels, blue jays and perhaps spring birds. During the day we visited the Tory House and Giant's Castle. From the valley, Bridal Veil Fall shows an immense ice cone.

The following plants: *Hypoxylon fuscopurpureum* (Schw.) Berk. on rotten logs; and *Polyporus picipes* Fr.

*Lecanora varia* (Ehrh.) Ach. on branches.

*Orthotrichum speciosum* Nees on willow trunks.

May 8, 1909. Helderbergs for the afternoon. I reached the cliffs a mile east of Bridal Veil, via the bog and low woods in the valley, and easily climbed the brow of the escarpment up a partial stream bed some distance from the main wagon road. Between this stream bed and the Bridal Veil Fall, I discovered a "high water" waterfall, which some distance back from the brow of the cliff flows down a picturesque ravine of shale. Fine views from the cliffs in spite of the far away haze. In the vicinity of Fallen Rocks, two red-shouldered hawks circled the air and uttered their shrill kee-you, kee-you. One of the birds was much noisier than the other, and after tiring itself out would alight in the top of a dead tree below the cliff. Very evidently they have a nest in the top of a tree somewhere below the brow of the cliff. Hermit thrushes and many other birds; and delayed vegetation makes up for time lost. Descended late in the afternoon by the short-cut trail and find it lies near the landslide of the spring of 1908, but whether the trail has been changed since the slide took place, I cannot say with certainty.

The following plants seen or collected: *Daedalea confragosa* (Bolt.) Pers., two forms on canoe birch, one with a thickened roughened pileus; *Diplocladium penicilloides* Sacc. on old *Polyporus resinosus*, deposited in the State Herbarium as new to the state; *Fomes pinicola* (Sw.) Cke. on hemlock stump; *Massaria vomitoria* B. & C. on limbs of *Acer rubrum*, part in the State Herbarium; *Polyporus betulinus* (Bull.) Fr., a plant bearing three separate fruiting pilei at angles to each other, due to the falling of a canoe birch trunk; *Sarcoscypha coccinea* (Scop.) Sacc. on old sticks.

*Cladonia furcata* (Huds.) Schrad.; *Cladonia furcata racemosa* (Hoffm.) Flk.; *Cladonia pyxidata neglecta* (Flk.) Mass.; *Lobaria pulmonaria* (L.) Hoffm. (*Sticta pulmonaria* (L.) Ach.); *Parmelia perlata* (L.) Ach. on fallen hemlock; *Pertusaria leioplaca* (Ach.) Schaer., on trunk of *Ostrya*, determined by Dr. L. W. Riddle, deposited in the State Herbarium as new to the state; and *Physcia adglutinata* (Flk.) Nyl. on the trunk of *Ostrya*.

*Bazzania trilobata* (L.) S. F. Gray; *Lophozia barbata* (Schreb.) Dum.; *Ptilidium ciliare* (L.) Nees on the ground and *Ptilidium pulcherrimum* (Web.) Hampe on coniferous logs.

*Plagiothecium denticulatum* (L.) B. & S., base of a tree.

*Polypodium vulgare* L., fruiting specimens on logs.

*Dentaria diphylla* L.; *Chrysosplenium americanum* Schwein.; *Viola pallens* (Banks) Brainerd; *Epigaea repens* L., a little left in the woods about the swamp in the valley. Skunk cabbage in swamps; tamaracs, poplars and willows becoming green; and shad bushes whitening the uplands.

May 16, 1909. We left the city on the morning train, last night's heavy shower filling the waterfalls and beating down the clay road like a floor. During the first shower, we were under the cliff at Little Fall, listening to the thundering of the falling water; during the second shower, we were in a large empty barn a short distance back of Mine Lot Fall, where we were entertained by a chorus of hens. On returning to Table Rock we found a dense fog had rolled in and filled the vast amphitheater, and this did not disperse until a slight breeze sprang up a little after noon, when we had reached the summer house on East

Cliff. It was a glorious sight to see how quickly the fog lifted and was melted away. The greens of the spring foliage in the valleys and on the mountain side were of many shades and hues. A scarlet tanager posed on a shrub, and we approached quite near before it flew a little further on.

Collected and observed the following plants: *Vaucheria sessilis* (Vauch.) DC., together with a *Spirogyra* sp. (filaments 40 x 42–60 $\mu$, one spiral) in felt-like mats at the mouth of cold spring near Little Fall.

*Aleurodiscus Oakesii* (B. & C.) Cke. and *Exidia glandulosa* (Bull.) Fr. on bark of *Ostrya;* and *Septoria viriditingens* Curt. on leaves of *Allium tricoccum.*

*Biatora coarctata* (J. E. Sm.) Tuck. on limestone, determined by Dr. Riddle; *Biatora hypnophila* (Ach.) Tuck. on mossy rocks; *Collema ryssoleum* Tuck. on rocks; **Lecanora (§ Callopisma) cerina siderites** (Tuck.) n. comb. (*Placodium cerinum siderites* Tuck.) on limestone, determined by Dr. Riddle, part in State Herbarium as new to the state; *Lecanora subfusca* (L., Nyl.) Ach. on trunks of *Hicoria ovata; Lobaria amplissima* (Scop.) Arn. (*Sticta amplissima* (Scop.) Mass.) on trunks of trees; *Parmelia olivacea* (L.) Ach. on bark of *Hicoria; Parmelia rudecta* Ach. on *Juniperus sibirica;* and *Platysma Oakesianum* (Tuck.) Nyl. (*Cetraria Oakesiana* Tuck.) on trunks of hemlock and birch.

*Oryzopsis asperifolia* Mx. and *Arabis laevigata* (Muhl.) Poir.

July 17, 1909. Indian Ladder bogs in the afternoon. About the deserted house east of the pine grove. *Hemerocallis fulva* L.; *Saponaria officinalis* L.; *Robinia Pseudacacia* L.; cypress spurge, *Tithymalus cyparissias* (L.) Hill; *Carum carui* L.; *Solanum Dulcamara* L. and *Symphoricarpos racemosus* Mx.

By the roadsides. *Panicularia grandis* (S. Wats.) Nash and *Salix cordata* Muhl. in a wet place. *Atriplex hastata* L. at Meadowdale station. *Vicia tetrasperma* (L.) Moench; *Ceanothus americanus* L.; *Apocynum album* Greene; *Phryma Leptostachya* L.; *Galium lanceolatum* Torr. in pine woods; and *Campanula rapunculoides* L.

The following from Woodwardia bog, which was dry enough to easily get on. *Sphaerella Sarraceniae* (Schw.) Sacc. on leaves of *Sarracenia purpurea.*

*Sphagnum magellanicum* Brid. (*S. medium* Limpr.), determined by Dr. A. LeRoy Andrews.

*Picea mariana* (Mill.) BSP.; *Carex tribuloides* Wahl.; *Carex trisperma* Dewey; *Eriophorum gracile* Koch; and *Andromeda Polifolia* L., a few plants.

The poison sumac is too abundant in the swamp on the east side of the road to explore extensively, but the following plants were found: *Cercospora Symplocarpi* Pk. on leaves of *Spathyema*.

*Amblystegium filicinum* (L.) DeNot.; and *Hypnum imponens* Hedw. on logs.

*Dryopteris Clintoniana* (D. C. Eaton) Dowell.

*Agrostis Schweinitzii* Trin.; *Bromus ciliatus* L.; *Hystrix Hystrix* (L.) Millsp.; *Carex disperma* Dewey (*C. tenella* Schkr.); *Carex granularis* Muhl.; *Carex scabrata* Schwein.; *Uvularia grandiflora* J. E. Sm.; *Uvularia sessilifolia* L.; *Sassafras Sassafras* (L.) Karst.; *Hamamelis virginiana* L.; *Acer pennsylvanicum* L.; *Sanicula gregaria* Bicknell; *Steironema ciliatum* (L.) Raf.; *Asclepias exaltata* (L.) Muhl. and *Aster nobilis* Burgess.

October 23, 1909. Afternoon at the Helderbergs. Autumn colors, the leaves only partly fallen. Climbed the eastern stream bed in the west amphitheater and then followed the Bear path around the base of the cliffs to the Tory House. The upper portion of the stream bed filled with huge boulders, carpeted with mosses and ferns. Along the dry bed of the stream found *Asplenium pycnocarpon* Spreng. (*A. angustifolium* Mx.) and *Dryopteris Goldieana* (Hook.) A. Gray. Gray squirrels, chickadees, blue jays and other birds. A fairly good-sized paper hornet's nest, and on the train was asked by several if I was sure the hornets were out? The fruit of witch hazel, for several days after bringing indoors, would shoot dark shiny seeds for seven or eight feet.

The following plants seen or collected: *Daedalea quercina* (L.) Fr. on oak stumps; *Fomes pinicola* (Sw.) Cke. on birch (!); *Lactarius cicilioides* (Fr.) Fr.; *Merulius tremellosus* Schrad. on logs; *Myxosporium nitidum* B. & C. on old branches of *Cornus rugosa; Pleurotus sulfureoides* (Pk.) Sacc. on old hemlock logs; *Polyporus fumosus* (Pers.) Fr. on elm logs; and *Trogia crispa* (Pers.) Fr. on birch.

*Catherinea angustata* Brid. and *Hypnum molluscum* Hedw.

*Benzoin aestivale* (L.) Nees; *Hedeoma pulegioides* (L.) Pers.; *Carduus crispus* L., *Centaurea nigra* L. and *Crepis* sp. were found in a newly seeded field near the foot of Indian Ladder hill. A portion of the collection of the *Carduus* was deposited in the State Herbarium as new to the state.

April 17, 1910. We left on the morning train for a day in the Helderbergs. We crossed the fields from Meadowvale to the west amphitheater and ascended the rugged rocky ravine to the mouth of Hailes' Cavern. No snow in Helmus Crack or at the base of the waterfalls, although a little in the ravine in spots, about which spring flowers were blooming. There were some banks of snow in the open fields at the top of the cliffs.

There is a beautiful view over the forested enclosed valley of the west amphitheater from the cliffs. Canoe birch trees are very conspicuous to-day. Last season's fronds of evergreen ferns closely pressed to the ground; indeed the heavy weight of the snow has pressed flat the grass and weeds. The body of a muskrat, at the base of the cliff, near Little Fall. A good day for lichens and mosses, because of the misty rain. Descended the short-cut trail to the railroad station, and late in the afternoon went down the railroad track towards Altamont, about a mile, to a piece of woods.

Collected and observed the following plants: *Diatrype stigma* (Hoffm.) Fr. on old sticks.

*Arthonia radiata* (Pers.) Th. Fr. on trunks of *Ostrya*, determined by Dr. Fink; *Leptogium lacerum* (Retz.) S. F. Gray on *Encalypta streptocarpa; Parmelia crinita pilosella* (Hue) Merrill on oak trunks; *Pertusaria velata* (Turn.) Nyl. on oak trees; *Physcia stellaris* (L.) Nyl. on hickory and *Ostrya* bark; *Secoligna cupularis* (Ehrh.) Norm. (*Gyalecta cupularis* (Ehrh.) Schaer.) on limestone; *Verrucaria papularis* Fr. on limestone, determined by Mr. G. K. Merrill, part deposited in the State Herbarium as new to the state; *Verrucaria rupestris* Schrad. on limestone, determined by Dr. Fink.

*Hypnum cupressiforme* L. on dry rocks near the base of Mine Lot Fall, determined by Dr. A. J. Grout.

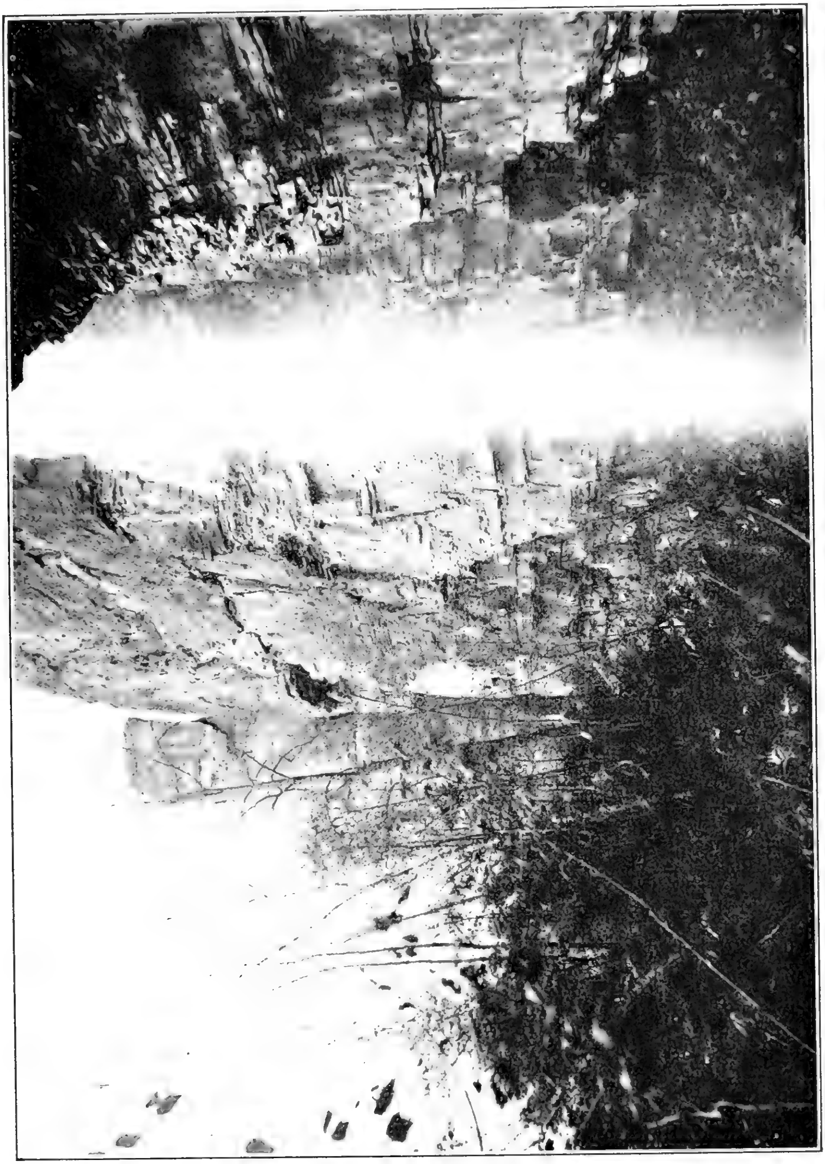

FIG. 9. The Bridal Veil of the Helderbergs and the Monolith.

*Pinus rigida* Mill., on East Cliff; *Aplectrum hyemale* (Muhl.) Torr. in leaf, woods between Mine Lot and East Cliff, a few plants; *Caulophyllum thalictroides* (L.) Mx.; *Bicuculla canadensis* (Goldie) Millsp. more abundant than *Bicuculla Cucullaria* (L.) Millsp., the leaves of the squirrel corn are darker, deeper green and more whitened beneath; *Dentaria maxima* Nutt., abundant in the west amphitheater; *Glecoma hederacea* L., high up the ravine on rocks, the stream from Hailes' Cavern, appearing as if native.

The following plants from the woods down the railroad tracks. *Hypoxylon cohaerens* (Pers.) Fr. on beech; *Polyporus Schweinitzii* Fr. on old coniferous stumps; *Puccinia Claytoniata* (Schw.) Syd. on leaves of *Claytonia caroliniana* Mx.; *Sarcoscypha coccinea* (Scop.) Sacc. on buried sticks; and *Septoria Waldsteiniae* Pk. & Clint. on leaves of *Waldsteinia*.

*Hylocomium triquetrum* (L.) B. & S. in a low place; and *Hypnum molluscum* Hedw.

*Veratrum viride* Ait; *Cardamine bulbosa* (Schreb.) BSP. in wet places; *Rubus triflorus* Richards.; *Floerkea proserpinacoides* Willd., not very rare; *Viola conspersa* Reichenb.; *Viola eriocarpa* Schwein. and *Panax trifolium* L.

April 29, 1911. The afternoon at Meadowdale, down the railroad track towards Altamont to several pieces of woods. The country and woods very dry, but vegetation growing rapidly.

Frightened up a partridge, and saw flocks of redwing blackbirds. Several large ant hills in the low woods, north side of the track. Visited an old abandoned house, with but few windows and but one door, at the rear, by a stream in the pasture, under the shadow of the Helderbergs. A woodchuck the only occupant now. Formerly a dam was near the house and the partial remains of a sawmill still stands. In the first woods down the track from the station, fallen black ash, *Fraxinus nigra* L., logs with large burls encompassing the trunks, on which were patches of sharp black points, perhaps of fungus origin. At the wood margin stands an oak, 50 to 60 feet high, and at the base of the trunk is a large cancer-like growth (with bark) three to four feet high and three to four feet or more in diameter—a very curious growth indeed.

The following plants: *Omphalia campanella* (Batsch) Quel. on old pine logs; and *Fomes conchatus* (Pers.) Gill. on black ash logs.

*Bryum intermedium* Brid., at base of trees; *Thuidium delicatulum* (L.) Mitt. and *Webera sessilis* (Schmid.) Lindb.

*Polystichum acrostichoides* (L.) Schott., still prostrate on the ground; and *Equisetum arvense* L.

*Erythronium americanum* Ker.; *Caltha palustris* L.; *Hepatica Hepatica* (L.) Karst.; *Podophyllum peltatum* L.; *Sanguinaria canadensis* L.; *Bicuculla Cucullaria* (L.) Millsp.; *Dentaria diphylla* L.; *Acer rubrum* L.; *Sambucus pubens* Mx. and *Tussilago Farfara* L.

> "And so, all hail, fair Helderberg, all hail!
> Thou livest in the heart of all thy sons,
> Unchanged by time, by tide, by tempest rude,
> Embosomed deep in fondest memory
> And held in everlasting joy and love."

During the winter of 1913–1914, Mrs. Emma Treadwell Thacher, of Albany, gave to the state of New York, about 350 acres of land back from the edge of the Indian Ladder Cliffs in the Helderbergs. Three miles of cliff front is included in this munificent gift; which bears the name of her distinguished husband, "John Boyd Thacher Park." The gift was accepted by the state as a public park, March 4, 1914; dedicated September 14, 1914, and was placed in the custody of the American Scenic and Historic Preservation Society, with Prof. John H. Cook as superintendent of the park.

HUDSON FALLS, N. Y.

## BOTANICAL ABSTRACTS

A meeting of editors of botanical publications was held at Pittsburgh, on December 28, 1917, to consider the desirability of undertaking the publication of an abstracting journal of botany. After a long discussion the following resolution was adopted:

"*Resolved*, that we, as a group of botanists interested, invite each botanical society to appoint a committee of two to meet with committees of other societies and with the members of this group, to formulate a program for a journal of botanical abstracts, botany to be interpreted in its broadest sense. In case action of any society is delayed, the president and secretary of such society are invited to represent it. A meeting is called for 10 A.M., December 30, at Parlor 140, Fort Pitt Hotel."

At this augmented meeting of December 30, after informal discussion it was voted that the 26 botanists present proceed to formal organization under the name "Temporary Board of Control of Botanical Abstracts." Donald Reddick was elected chairman and Forrest Shreve secretary. On motion it was voted that the board provide for its perpetuation in the following way:

1. That the following botanical organizations be asked to elect two members each:

American Association for the Advancement of Science, Section G.
American Genetic Association
American Microscopical Society
American Phytopathological Society
American Society of Agronomists
American Society of Naturalists
American Conference of Pharmaceutical Faculties
Botanical Society of America $\left\{\begin{array}{l}\text{General Section}\\ \text{Physiological Section}\\ \text{Taxonomic Section}\end{array}\right.$
Ecological Society of America
Paleontological Society of America
Society for Horticultural Science
Society of American Bacteriologists
Society of American Foresters.

2. That in the election of members to the Board of Control of Botanical Abstracts each society be asked to name one man for a short term of two years and one man for a long term of four years, and that a member be elected biennially thereafter or as required.

On motion the Temporary Board of Control elected by ballot an executive committee of ten on organization, to act for one year with power to make arrangements for editorial management and publication. This committee is constituted as follows:

J. H. Barnhart
Henry C. Cowles
B. M. Duggar
C. Stuart Gager
R. A. Harper
Barton E. Livingston
F. C. Newcombe
Donald Reddick, *Chairman*
C. L. Shear
Forrest Shreve

The executive committee of the Temporary Board of Control selected B. E. Livingston for editor-in-chief and the following as associate editors in charge of the sections as indicated:

Agronomy and Soil Technology, ————*
Bacteriology, H. J. Conn
Botanical Education, C. Stuart Gager
Cytology, C. J. Chamberlain
Ecology and Plant Geography, Henry C. Cowles
Forestry, Raphael Zon
Genetics, G. H. Shull
History, Biography and Bibliography, J. H. Barnhart
Horticulture, W. H. Chandler
Morphology, E. W. Sinnott
Paleobotany, E. W. Berry
Pathology, Donald Reddick
Pharmacognosy, Henry Kraemer
Physiology, B. M. Duggar
Taxonomy, J. M. Greenman and J. G. Schramm

It is expected that the work of abstracting will begin at once with the international literature of the year 1918 and that publication will follow promptly.

On May 20 the following letter was issued by the committee having the work in charge:

"The long-cherished dream of American botanists is at the point of actual realization, and we shall soon have an abstract journal published in this country if you will promptly place

* Name to be supplied.

yourself on record with the publishers, as one who will support the new enterprise.

"We are sure that you will extend a cordial welcome to Botanical Abstracts, the first issue of which is expected to appear in June, 1918, and we hope you will appreciate that the starting of the new journal is dependent upon the very prompt support of as large a number of Americans and American institutions as can possibly be enlisted. We know you will subscribe, but it is more than important that you act very promptly in this matter. For many reasons it is highly desirable that the new series start as soon as possible and we need your support before actual publication can begin. May we not depend on you to have your subscription in the hands of the publishers within a week?

"Everyone interested in any phase of plant life will have many needs for Botanical Abstracts, which is planned to cover the world literature of the subject in a very thorough way. We are sure that the new journal will be easily worth the subscription price to you. Furthermore, it will be a great day for American science when Botanical Abstracts comes into being. For your own benefit, for the advancement of science in general, and for the increased prestige of American work, we hope you will not delay in the sending of your subscription to the publishers.

"We also hope you will do all in your power in other ways, to make it possible to launch this worthy project immediately. It is unnecessary to point out that libraries are now unable to obtain the German botanical abstract journal, that their allotments for this purpose cannot be spent for this, and that the American series, with your support, will be more prompt and more efficient than the German one, which never has been very satisfactory. Institutional subscriptions are usually slow in coming in, and we ask you to do your best to have the subscription of your institution, as well as your own personal one, sent in at a very early date. Please also do all you can to further this undertaking by arousing interest and enthusiasm and obtaining subscriptions in other institutions and among your colleagues. Every subscription, and every promised subscription counts toward the actual inauguration of the greatest undertaking yet proposed by American botanical workers.

"Payment may be made at any time within three months from the date of publication of the first issue, but your subscription (and as many more as you can get) is needed immediately. It should be forwarded directly to the publishers (The Williams & Wilkins Co., 2419 Greenmount Ave., Baltimore, Md.) on one of the blanks enclosed herewith.

"Trusting that we may have your approval and support and the prompt receipt of your subscription, we are,

"Very truly yours,

"EXECUTIVE COMMITTEE OF THE TEMPORARY BOARD OF CONTROL OF BOTANICAL ABSTRACTS

J. H. BARNHART, New York Botanical Garden,
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F. C. NEWCOMBE, University of Michigan,
DONALD REDDICK, *Chairman*, Cornell University,
C. L. SHEAR, U. S. Department of Agriculture,
FORREST SHREVE, Desert Botanical Laboratory"

The announcement mentioned as being enclosed with the letter repeats matter already reprinted, and in addition urges every one to subscribe. The publication is to be a monthly and the subscription price is six dollars a year. Subscriptions should not be sent to any of the men listed above but directly to the publishers, Waverly Press, 2419 Greenmount Avenue, Baltimore, Md.

## REVIEWS

### Britton's Flora of Bermuda*

In the bibliography which is an appendix to this newest volume by Dr. Britton, the statement is made that O. A. Reade's "Plants of the Bermudas," 1885, is the only descriptive flora of the island heretofore published. That book lists about 150 plants native and naturalized, while the present flora contains 165 flowering plants, ferns and their allies, the rest of the total number of 709 species now credited to the island being found among so-called cryptogamous groups. Of the 61 truly Bermudian (endemic) species, 4 are monocotyledons, six are dicotyledons, one is a Juniper, and 4 are ferns. All the rest are among the Mosses, Hepatics, Lichens and Fungi.

There are keys and descriptions of all the plants known from

* Britton, N. L. Flora of Bermuda. Pp. 1–585. Illustrated. Chas. Scribner & Co., N. Y. 28 February 1918. Price $4.50.

the island, both native and cultivated, or mention is often made of the latter without description. Each of the native and naturalized species among the flowering plants and ferns is accompanied by an illustration, which, as in *Illustrated Flora*, forms an invaluable aid to identification. In fact, not only is this the best book on the flora of the island, it is practically the only one, so far as the general public is concerned.

Special groups such as Fungi, Algae, etc., have been contributed by experts, mostly Dr. Britton's associates at the New York Botanical Garden. The inclusion of these groups and also 864 cultivated plants makes the volume the "most complete description of all the plants of a small area that has ever been published."

When normal travel is resumed, the book will have a large field of usefulness to the host of people who annually visit the Island, and it makes a notable addition to this author's previous volumes.

Norman Taylor.

## PROCEEDINGS OF THE CLUB

### April 9, 1918

The meeting was held at the American Museum of Natural History at 8:15 P.M. President Richards occupied the chair. There were thirty persons present.

The following persons were nominated and elected to membership: Miss Mabel L. Merriman, Hunter College, New York City; Miss Grace E. Stone, Teachers College, New York City; and Dr. Richard H. Boerker, 104 West 85th Street, New York City.

No other business was transacted at this meeting.

Dr. Edmund W. Sinnott delivered the lecture of the evening; an abstract of his lecture on "Australian Plants" is appended. The lecture was illustrated with lantern slides.

The speaker was able to spend nearly a year in Australia and New Zealand in 1910–11 in collecting embryological and anatomical material of certain plant families.

The humid subtropical region of southern Queensland, the flora of which includes a large Malayan element, was visited;

as was the interior of New South Wales, with its more arid climate and typically "Australian" vegetation, the Proteaceae, Myrtaceae and Leguminoseae being predominant. In Victoria, especial attention was paid to the forests of very tall eucalyptus trees. A short stay was made in West Australia.

New Zealand was covered rather thoroughly and extensive collections made of the flowers of the Podocarpineae and of *Agathis australis*, the Kauri pine. The Southern Alps, with their wonderful alpine flora, were visited, as was the "Fossil Forest" at the southern tip of the Dominion.

The floras of Australia and New Zealand present many interesting phytogeographical problems, possessing four distinct elements, the Australian, Himalayan, Malayan and Antarctic. Several hypotheses, involving previous land connections and climatic changes, have been put forward to explain the facts.

Meeting adjourned.

B. O. Dodge,
*Secretary*

## NEWS ITEMS

We learn with regret of the death, early in June, of Frank N. Meyer, one of the most successful agricultural explorers ever sent out by the Government. Thousands of valuable plants from China and Japan have been sent by him to the Bureau of Plant Industry and from there distributed as "Plant Immigrants." Excepting only E. H. Wilson probably no recent explorer has sent such rich collections from the East. Mr. Meyer was missed from a steamer on the Yangste, from which river his body was afterwards taken. There were no indications as to the cause of death.

# The Torey Botanical Club

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# OTHER PUBLICATIONS

OF THE

# TORREY BOTANICAL CLUB

## (1) BULLETIN

A monthly journal devoted to general botany, established 1870. Vol. 44 published in 1917, contained 579 pages of text and 26 full-page plates. Price $4.00 per annum. For Europe, 18 shillings. Dulau & Co., 47 Soho Square, London, are, agents for England.

Of former volumes, only 24–44 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–44 three dollars each.

Single copies (30 cents) will be furnished only when not breaking complete volumes.

## (2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–15 are now completed; No. 1 of Vol. 16 has been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

DR. BERNARD O. DODGE

Columbia University

New York City

Vol. 18 August, 1918 No. 8

# TORREYA

A Monthly Journal of Botanical Notes and News

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873.

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# THE TORREY BOTANICAL CLUB



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NORMAN TAYLOR
Brooklyn Botanic Garden
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# TORREYA

August, 1918

Vol. 18 No. 72

## KEITHIA ON CHAMAECYPARIS THYOIDES

By J. F Adams

The genus *Keithia* was originally established by Saccardo* to include *Phacidium tetrasporum* Phil. & Keith on *Juniperus communis*.

Durand† in his discussion of the genus included *Stictis Tsugae* Farlow on *Tsuga canadensis* and a new species *K. thujina* Durand on *Thuja occidentalis*. The latter species was collected by Dr. J. J. Davis in Wisconsin, 1908. The genus thus came to include three species which are parasitic on the leaves of *Juniperus communis*, *Thuja occidentalis*, and *Tsuga canadensis*.

Since Durand's paper on the genus *Keithia* appeared Weir‡ has reported *K. Thujina* on *Thuja plicata* and states that it is widely distributed throughout the range of its host. The same species has been collected on *T. occidentalis* in Walden, Vermont (July 4, 1917), by Professor C. R. Orton, which is the first report of the species that far east.

In the summer of 1915 Professor R. A. Harper and Dr. B. O. Dodge collected a discomycetous fungus on *Chamaecyparis thyoides* at Lakehurst, New Jersey, which plainly belongs to the genus *Keithia*. Material was turned over to the writer for cytological and morphological study and additional material was collected June 14, 1916.

The white cedars that were infected in 1915 were carefully examined in April, 1916, but no symptoms of infection were

* Saccardo. Syll. Fung. **10**: 49. 1892.

† Durand, E. J. The Genus *Keithia*. Mycologia **5**: 6–12. 1913.

‡ Weir, J. R. *Keithia Thujina*, the cause of a serious leaf disease of the Western Red Cedar. Phytopathology **6**. 360–363. 1916.

[No. 7, Vol. 18 of Torreya, comprising pp. 127–156, was issued 15 August, 1918]

evident. On a later trip (June 14, 1916) to the same vicinity the trees showed scattered infections. The infected leaves appeared brown and small apothecia of the fungus could be recognized. The apothecia develop on the upper surface of the leaves as circular or elongated pustules slightly raised above the leaf surface. The overlying part of the epiderm ruptures along the margin of the apothecium and for some time is retained as a flap or scale as

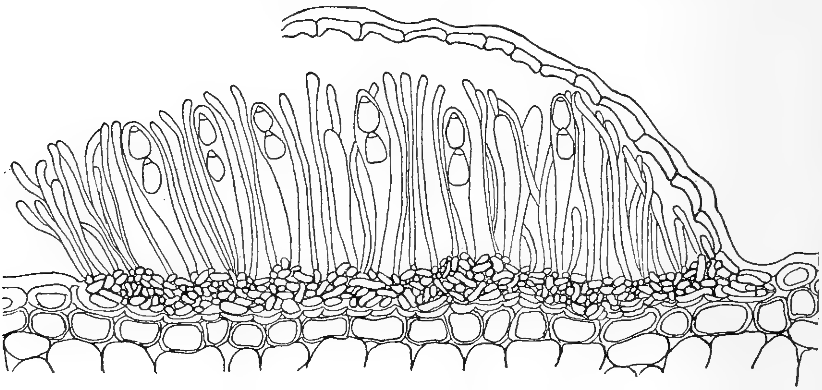

FIG. 1. A cross section of an apothecium of *Keithia* on *Chamaecyparis thyoides*. This shows its epidermal development and marginal dehiscence with the overlying flap or scale which consists of the upper half of the epidermal cell walls with the thickened cuticle. The margins consist of filaments similar in form to the paraphyses forming there a false excipulum.

described for *K. thujina*. The exposed apothecia are brownish in color and resemble sori of uredospores. It was observed that as a rule infection was confined to the lateral leaves. In the majority of cases dead terminal leaves were found to be infected with *Lophodermium Juniperinum* Fries. This fungus appeared to be more prevalent than *Keithia*. Ellis and Everhart* have reported it on *Chamaecyparis thyoides* from Newfield, New Jersey, as occurring on dead leaves.

Weir has emphasized the importance of *K. thujina* as a dangerous parasite on *Thuja plicata*. Observations by Dr. J. J. Davis in Wisconsin indicate that it is not serious, since only a limited amount of leaf tissue is destroyed. The vigor of the trees is not

* Ellis, J. B., & Everhart, B. M. The North American Pyrenomycetes, 718, 1892.

impaired. Our observations of the fungus on *Chamaecyparis* agree with those of Davis. As previously noted, the *Lophodermium* appears more destructive than *Keithia.* It is plainly possible, however, that under more favorable conditions these fungi might become serious.

The form of *Keithia* on *Chamaecyparis* differs in several points from *Keithia Thujina* on *Thuja.* Specimens of the collections by Davis, Weir and Orton deposited in the herbarium of the New York Botanical Garden have been compared.

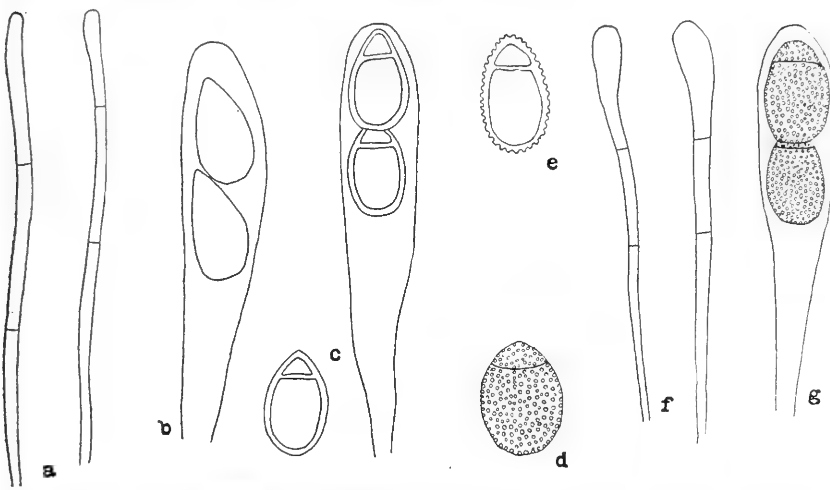


FIG. 2. *a-c. Keithia* on *Chamaecyparis thyoides.* *a,* paraphyses; *b,* immature ascus; *c,* matured spore and ascus; *d-g, Keithia thujina*; *d* and *e,* surface and sectioned view of mature spores; *f,* paraphyses; *g,* màtured ascus.

The fungus develops in the epidermal layer in such a manner that the cells are split. The portion raised above the apothecia consists of the upper halves of the epidermal cell walls with the thickened cuticle. *Keithia Thujina* on *Thuja* develops subepidermally and the hyphae of the fungus are conspicuous in the mesophyll of the leaf.

The variation in the spores is the most characteristic difference. The spores of our form are smooth walled in contrast to the pitted walls found in *K. Thujina.* In both forms the spores are divided into two unequal cells, the distal one being much smaller. The two spores occur end to end in the ascus with the small end of each spore always uppermost. Branching paraphyses were not observed nor are the paraphyses so enlarged at their ends as in the form on *Thuja*. The margin of the apothecium consists of filaments similar in form to the paraphyses forming there a false excipulum. The hypothecium is poorly developed. Durand has referred to the weak development of the excipulum and hypothecium in all the species of *Keithia*. On the basis of his studies he is of the opinion that the affinities of *Keithia* are not with the Phacidiaceae as contended by Saccardo but with the Stictidiaceae.

The manner of dehiscence, the poorly developed excipulum and hypothecium and the soft, waxy condition of the apothecia are certainly characters showing relationship to Stictidiaceae rather than to the Phacidiaceae.

The differences mentioned are made the basis on which the following new species is described.

**Keithia Chamaecyparissi** sp. nov.

Apothecia epiphyllous, intra-epidermal, erumpent by marginal dehiscence of overlying cell walls in form of scale, slightly elevated, cushion-like, waxy, olive brown, circular, elliptical or curved, 135–300$\mu$ broad $\times$ 430–1025$\mu$ long; asci two-spored, elongate clavate, 13–18 $\times$ 72–90$\mu$; paraphyses filiform, septate, slightly longer than asci, ascospores at first hyaline, becoming olive brown when mature, continuous when young, divided into two unequal cells, the distal one smaller, pyriform-ellipsoid, 10–13 $\times$ 15–24$\mu$.

On leaves of *Chamaecyparis thyoides* (L.) B.S.P.

Type locality: Lakehurst, New Jersey.

Distribution: Known only from the type locality.

Specimens have been deposited in the herbarium of the Botanical Department of Columbia University and the New York Botanical Garden.

COLUMBIA UNIVERSITY

# QUERCUS BERNARDIENSIS SP. NOV.

By W. Wolf, O.S.B.

This is a species of the Lepidobalani. Apparently it is closely related to *Q. Boyntonii* Beadle,* differing from it by more numerous lobes of the leaves, the whitish, instead of brownish tomentum, the somewhat larger fruit, and obtuse scales of the cup. Its presence has been observed repeatedly within the past ten or more years, but only recently have full data been collected.

It is a small tree of a maximum size of 14 meters and a trunk diameter of 4.5 dm., or a shrub from a clump about 1.5 m. high, with deciduous, firm leaves, at length puberulent or glabrous branchlets, and a fissured and transversely broken gray bark. The trunk is rather evenly straight; the branches, in older trees, are rather few and spreading and not much crooked.

The leaves are 6–18 cm. long, oblong, obovate, or cuneate-obovate in outline, cuneate or rounded at the base, shallowly 7–13-lobed; the lobes ascending-triangular, obtuse or rarely acutish, little less than one third to one half as deep as the width from the midrib to the margin; upper surface generally yellowish-green and sooner or later becoming glabrous, lower side permanently covered with a white or whitish tomentum of short hairs.

The slender staminate aments are 2.5–9 cm. long, peduncle included. Peduncle, rhachis and calyx are tomentulose; the calyx 4–7-lobed, the lobes ciliate; stamens 3–8. The pistillate flowers are sessile or short peduncled; the styles short and rather stout.

The fruit is sessile or subsessile; the cup 11 to 16 mm. broad and about 10 mm. high, hemispheric or cupuliform, the edge thin, the scales about ovate, obtuse or blunt, imbricated, and generally densely grayish-tomentulose; the acorns oblong or oblong-ovoid 15–20 mm. long, 10–13 mm. thick, tomentulose at the apex, one third to rarely one half included in the cup.

Type specimen in Herb. St. Bernard College no. 1580 *a* and *b*.

Its habitat is a low narrow strip along the Little River or as it

* The species is known to the writer from description only.

is often named, the Eight Mile Creek, in Cullman County, northern Alabama. The soil is alluvial sand, in some places rocky, and occasionally overflowed. Its characteristic associate is *Quercus Prinus* L., a species not inhabiting the xerophile upland woods of this locality, but confined to the steeper rocky slopes and cliffs approaching the bed of the river and the narrow tracts of lowland for some distance. It is in this lowland that both species meet, but *Q. bernardiensis* never rises up the slopes or cliffs with *Q. Prinus*, being strictly confined to the afore-mentioned lowland tract, nor barring one exception is it found in the long tracts of somewhat broadened lowlands with adjacent, more or less gentle slopes, where, likewise, *Q. Prinus* is not found. Others, like *Q. alba*, *stellata*, and *velutina*, are not characteristic associates because they are met with almost everywhere within this locality, while the associated species *Q. nigra* L. and *hybrida*, *Carpinus caroliniana*, *Ostrya virginiana*, *Liquidambar Styraciflua*, *Nyssa sylvatica* are in so far characteristic as they indicate the mesophile character of the species.

St. Bernard College,
St. Bernard, Ala.

## ECOLOGICAL SOCIETY OF AMERICA

### The Preservation of Our Native Plants

By John W. Harshberger

The agencies which are active in the destruction of our native plants have been increased remarkably within the last few years. The building of railroads, of good roads for automobiles, and of canals have materially altered the country-side some distance on both sides of the rights of way. The black clouds of smoke from the freight engines have destroyed many fine areas of woodland; individual trees worthy of preservation on account of their rarity, or historic interest, have not escaped the influence of the fine carbon particles, which fill up the breathing pores of the leaves. Many trees have also suffered from the evil effects of the noxious gases, which are products of the incomplete combustion of the soft coal, used on the engines. Near Philadelphia, if one ascends an elevation in Fairmount Park, he can trace the location of the railroad lines by the palls of smoke which hang over them and are blown about with the change in the direction of the wind. There are some places in the park where the hands are blackened by taking hold of the leaves and branches of the nearby trees. The herbaceous vegetation suffers also, though in a lesser degree. With the increase in the number of industrial plants on the lower Schyulkill River, the grass and flowers planted for decorative effect in Bartram's Garden have been injured by the acids which have been washed down by the rain from the atmosphere to the plants beneath.

The construction of fire-lanes along the right of way of the railroads, as in New Jersey, under laws of the state, has occasionally caused the extermination of rare plants. I have in mind two small cedar swamps in which grew the grassy fern, *Schiazea pusilla*, and which have been cleared of undergrowth and of the trees to widen the fire protecting area running parallel to the tracks of the railroad.

The clearing of land for industrial purposes often leads to the extermination of plants worthy of preservation. In New Jersey, not far from Camden, there was a field that was blue with the fringed gentian, *Gentiana crinita*. The drainage of the field and its use for building purposes has destroyed completely a plant locality worthy of careful preservation.

It seems very difficult, notwithstanding the fact that an educational propaganda has been carried on for many years, to get our people to realize the necessity for the preservation of our wild flowers. Recently an interesting case has come to my attention. A florist in Philadelphia displayed this spring, two large bunches of the flowers of the "bog asphodel," *Helonias bullata*, which were bought from a vender, who had gathered them in the marshland of New Jersey. A remonstrance was made to the florist with the request that he refuse hereafter to buy such wild flowers. At the same time he was asked to discountenance further practices of this sort. How much good this plea will do, it will be hard to estimate. Another case of thoughtlessness came to my attention a year ago. On one of our trolley cars riding in from the country were three women, loaded down with branches broken off our native flowering dogwood, *Cornus florida.* Attention was called to this ruthless destruction of one of our most ornamental native trees, but reference to their acts of vandalism was met with the request to mind one's own business. Automobile parties frequently are very destructive of the dogwood.

Just where the education of the public should begin it is hard to say. Children thoughtlessly believe any ground not strictly enclosed is open to the public and carry off flowers and break branches, etc. In Philadelphia, a neighbor was much annoyed by the depredations of small girls and boys. He had planted snowdrops in his grass plot, and whenever flowers appeared early in the spring, he found that many school children picked them to carry to their teachers. A shrub of *Xanthoceras sorbifolia* has had several branches broken off by children in search of the large green fruits, which appear in clusters on its upper branches. Another neighbor planted a row of peonies along the low side of her city yard. She was incensed by the theft of fine blooms from each one of her plants along the fence which was open to the depredations of the passerby. This illustrates that to start at the root of this evil, we must begin with the little children, even before they are five years old, for a little fellow five years old was found engaged in such thoughtless trespassing.

The Wild Flower Preservation Society has done wisely to begin its propaganda with the school children. The illustrated literature which has been issued from time to time, the framed colored pictures of flowers worthy of preservation and the lectures which have been given by the various members of the society, have done much good. Much remains to be accomplished to educate the rising generation to appreciate the natural and beautiful and to realize that other people have rights which ought to be respected. Also that plants on private grounds, even if accessible, are not public property. The proper inculcation of these principles will do much toward the preservation of wild flowers. In conclusion, one suggestion comes to me, as a method of reaching the public at large, and that is the preparation of lantern slides which could be thrown on the screen at performances of every moving picture establishment throughout the United States, calling attention to the necessity and desirability of the preservation of our wild fauna and flora, especially our native plants.

The following is a list of plants, which in the opinion of the writer, are most worthy of preservation and which are liable to extinction, if not carefully protected.

Climbing Fern—*Lygodium palmatum.*
Walking Fern—*Camptosorus rhizophyllus.*
Maiden Hair—*Adiantum pedatum.*
Tree Club Moss—*Lycopodium obscurum.*
Ground Pine—*Lycopodium complanatum.*
Indian Turnip—*Arisaema triphyllum.*
Bog Asphodel—*Helonias bullata.*
Grape Hyacinth—*Muscari botryoides.*
Moccasin Flower—*Cypripedium acaule.*
Showy Orchid—*Orchis spectabilis.*
Swamp Pogonia—*Pogonia ophioglossoides.*
Mistletoe—*Phoradendron flavescens.*
Calopogon—*Limodorum tuberosum.*
Sweet Bay—*Magnolia virginiana.*
Columbine—*Aquilegia canadensis.*
Blood-root—*Sanguinaria canadensis.*
Blue Lupine—*Lupinus perennis.*
Dogwood—*Cornus florida.*
Pinxter-flower—*Azalea nudiflora.*
Rhododendron—*Rhododendron maximum.*
Trailing Arbutus—*Epigaea repens.*
Laurel—*Kalmia latifolia.*
Fringed Gentian—*Gentiana crinita.*
Ground Pink—*Phlox subulata.*
Bluebells—*Mertensia virginica.*
Scarlet Painted-cup—*Castilleja coccinea.*
Cardinal flower—*Lobelia cardinalis.*

UNIVERSITY OF PENNSYLVANIA

# REVIEWS

### Hall and Ingall on Illinois Forests*

This important publication seems to be little known to botanists, and the reviewer was wholly unaware of it until it was about seven years old; but it deserves to be brought to the attention of readers interested in such matters even at this late date. Both the authors were (and are?) connected with the U. S. Forest Service, and the first-named is also the author of a preliminary report on the forests of Tennessee, published by the Geological Survey of that state about the same time.

As Illinois was originally about two thirds prairie, and most of the forest (as well as prairie) has long been superseded by cultivated fields, on account of the prevailingly fertile soils, one might not expect to find much of interest in a report on the existing forests of the state. The whole state is covered in a general way, but statistics are given only for the 26 most densely wooded counties; one in the driftless area in the northwest corner, two between the Illinois and Mississippi Rivers on the west side of the state, and 23 in the extreme south. These counties include less than one fifth of the area of the state, but about one third of its forests. (They contained at that time about a million acres of woodland, which Hall and Ingall thought to be about half the state total; but the results of the U. S. census of 1910, which were not available until a little later, showed over three million acres of woodland on farms in Illinois, and there is of course a little outside of the farms also.)

A small map in the introductory portion of the report divides the state into seven statistical divisions, and indicates the percentage of forest in each in 1880, following a book about the West by Robert P. Porter (director of the 11th Census). (The censuses of 1890 and 1900 did not give the acreage of woodland on farms, like those of 1870 and 1880, but that of 1910 did; too late however to be taken advantage of in the report under considera-

* Forest conditions in Illinois. By R. C. Hall and O. D. Ingall. Bull. Ill. State Lab. Nat. Hist. 9: 173–253. *pl.* 21–36 and frontispiece. 1911.

tion, as already indicated. Some of the results of it will be given below for comparison with Hall and Ingall's estimates.)

The first table in the report gives for nearly every county studied the total area, the wooded area, the total stand of timber, and the area of each of three types of forest: namely, bottoms, level uplands, and hills. Descriptions of each type follow, with many local details. Tables 2–4 give the percentages of different species of trees in bottoms, hills, and level uplands in the southern counties, and tables 5 and 6 similar data for bottoms and uplands in the three more northerly counties studied. (Even yet there are very few other publications giving the percentage composition of the forests for so large an area.) The species are not all separated in the statistics, however, many related ones of similar economic properties and not easily distinguished in winter and early spring (when most of the field work for this report was done) being lumped together, as in the case of the various black oaks, white oaks, hickories and ashes.

About three pages are then devoted to an account of the local distribution of the more important trees throughout the state, followed by a list of 129 species (including several large shrubs and introduced species), with technical and common names, but no indication of distribution or abundance.

The second half of the report is taken up mainly with questions of ownership and taxation of forest lands, utilization and management of forests, growth statistics of several species, forest protection, and suggested legislation. It differs from many if not most reports of similar size written by professional foresters in containing a bibliography; but most of the citations give no indication of the length of the papers cited (a very common omission), and about 15 per cent of the titles are of manuscripts, which few users of the report can ever hope to see. The illustrations are splendid, mostly full-page half-tone plates, and will be a revelation to those who have crossed Illinois on the railroads and seen little but settlements and vast level corn-fields. The one of *Pinus echinata* on the hills of Union County is especially noteworthy, being perhaps the only photograph ever published of that species growing naturally in Illinois.

From the first six tables an interested person can work out in a few hours the relative abundance of the species (or groups of related species) in different regions, and other phytogeographical data, such as are not yet available for many other parts of the country. This the reviewer has done, with the results set forth below. As the county is the unit of area in the statistics one cannot follow natural boundaries very closely, and thus an element of inaccuracy is introduced, which makes it hardly worth while to give the computed percentages for each species or group of species. In each of the following five regional lists the commoner species or genera are arranged in order of abundance as determined from the statistics, and the names of those which are more abundant in a given region than in the other four are printed in small capitals, which gives an additional basis for comparison without using any more words. Those whose percentages fall below 1 are omitted in most cases.

In the northern driftless region, typified by Jo Daviess County (and better by a number of neighboring counties in Wisconsin), thirteen per cent of the area was estimated by Hall and Ingall to be wooded, with an average timber stand of 805 cubic feet per acre; and 13 per cent of the forest is in bottoms and 87 per cent on uplands. (According to the 1910 census 17 per cent of the farm land in Jo Daviess County was woods, which would make 15.2 per cent of the total area even if all the land outside of farms was destitute of trees.) The commonest trees seem to be QUERCUS VELUTINA and other black oaks, *Quercus alba* and other white oaks, *Ulmus americana*, QUERCUS MACROCARPA, *Hicoria* spp., TILIA AMERICANA, *Acer saccharinum*, SALIX spp., BETULA LENTA, ACER SACCHARUM, JUGLANS NIGRA, *Fraxinus* spp., *Populus deltoides*, *P. tremuloides*?, and *Platanus occidentalis*. The various oaks make up about 56 per cent of the total.

On the west side of the state there is a small area south of the terminal moraine, including Calhoun County (almost the only one in Illinois without a railroad) and part of Pike. According to Hall and Ingall only 12 per cent of the area of these counties was covered with forest (but the census enumerators about the same time found 20 per cent of the farm land wooded, which would be equivalent to 18.4 per cent of the total area). The estimated stand of timber is 760 cubic feet per acre, and the bottom and upland types constitute about one third and two thirds respectively. The commonest trees seem to be *Quercus velutina* (etc.), Q. ALBA (etc.), ULMUS AMERICANA, *Hicoria* spp., *Quercus palustris*, ACER SACCHARINUM, PLATANUS, POPULUS DELTOIDES, *Tilia americana*, *Fraxinus* spp., and GLEDITSIA TRIACANTHOS. The percentage of oaks is almost exactly the same as in Jo Daviess County.

In the portion of the state covered by "lower Illinoisan" glaciation, a comparatively level plain in the southern half, with more forest than prairie originally, apparently, Hall and Ingall found less than 10 per cent of forest in the counties they investigated. But the contemporary census figures give 13.7 per cent of the farm land wooded in the same counties, and 12.5 per cent in the whole group of counties covered with that type of drift, which includes a few additional ones lying farther north and presumably having a little more prairie originally. (Farms cover nearly 90 per cent of the total area now, and the remainder is probably mostly towns and cities.) With respect to types, or topography, the forest is about 20 per cent bottoms, 5 per cent hills or slopes, and 75 per cent level uplands. The estimated stand is 700 cubic feet per acre, and the commonest trees seem to be *Quercus velutina* (etc.), *Q. alba* (etc.), Q. STELLATA, *Q. palustris*, *Hicoria* spp., *Ulmus americana* (etc.), QUERCUS MARYLANDICA, *Liquidambar*, QUERCUS IMBRICARIA, *Acer saccharinum*, *Fraxinus* spp., and *Quercus pagodaefolia*. The various oaks constitute over 70 per cent of the total, a figure perhaps not exceeded in any other equal area in the world.

In the unglaciated hill country near the south end of the state, sometimes called the Ozark region, about 20 per cent of the area is wooded, according to Hall and Ingall, which agrees pretty well with the census figures for woodland on farms. (But about 15 per cent of the area is not in farms, and practically none of that is prairie, and the settlements cannot cover more than a fraction of it, so that the total forest in 1910 must have been something like 30 per cent.) In the counties selected (by the reviewer) the forest types run about 15 per cent upland plain, 60 per cent hills, and 25 per cent bottoms; but a more exact location of the northern boundary would practically eliminate the upland plain type. The existing forests are somewhat denser than in the three regions previously noted, having about 900 cubic feet of timber per acre. The commonest trees are *Quercus velutina* (etc.), *Q. alba* (etc.), HICORIA spp., *Liquidambar*, *Quercus palustris*, *Q. stellata*, *Ulmus* spp., *Fagus*, FRAXINUS spp., *Acer saccharinum*, *Nyssa uniflora*, *N. sylvatica*, LIRIODENDRON, *Quercus marylandica*, *Acer Saccharum*, and *Quercus pagodaefolia*. The percentage of oaks is about the same as in the first two regions. In addition to the species indicated by the typography as being more abundant here than in other parts of Illinois there should be mentioned PINUS ECHINATA,which is said to grow nowhere else in the state, but is too scarce to enter into the statistics.

In the coastal plain or Tertiary region, which in Illinois corresponds approximately with the three southernmost counties, Hall and Ingall estimated the forest area at 31 per cent, which is probably none too much. (The 1910 census gives 26.8 per cent of the farm land wooded, but about one fourth of the area is not in farms, and if only as much as half of that was woods it would bring the total forest up to the figure named.) About two thirds of the existing forest is in bottoms and one third on hills, and the average stand is the highest of all, 1373 cubic feet per acre. The commonest trees seem to be *Quercus velutina* (etc.), Q. PALUSTRIS, LIQUIDAMBAR, *Quercus alba* (etc.), FAGUS, *Ulmus* spp., NYSSA UNIFLORA, *Hicoria* spp., *Acer saccharinum*, *Fraxinus* spp., TAXODIUM DISTICHUM, NYSSA SYLVATICA, and *Platanus occidentalis*. The oaks here make up only about 39 per cent of the total.

It seems from this report that in Illinois *Juglans nigra*, *Populus deltoides*, *Betula lenta*, *Quercus macrocarpa*, *Ulmus americana* *Acer Saccharum*, and *Tilia americana* are most abundant northward, and *Taxodium*, *Betula nigra*, *Fagus*, *Quercus stellata*, *Q. marylandica*, *Q. palustris*, *Q. imbricaria*, *Liriodendron*, *Liquidambar*, and both species of *Nyssa* southward. The reasons are probably chiefly climatic, but this will not hold for *Fagus*, unless we follow Fernald and Rehder in recognizing two forms,* and find that only the southern form enters Illinois in any quantity. Or it may be that the beech avoids the richest soils, with abundant soil fauna, such as characterize most of Illinois; though it is regarded as one of the most typical "climax" trees by the ecologists or successionists of the Chicago school. *Quercus velutina* appears to be the most abundant tree in the state. There are five or six evergreens in Illinois, but none are abundant enough to appear in Hall and Ingall's statistics, and all combined they probably do not make up more than 1 per cent of the forest wealth of the state.

If similar statistics could be worked out for other states it would go far toward filling the long-felt want of an inventory of our forests, which are becoming scarcer and more valuable all the time. About the only obvious shortcomings of this report are that it did not cover the whole state statistically, a forest map intended to accompany it was omitted for lack of funds, and the species are lumped together too much in the tables; all of which could probably be remedied without great expense.

ROLAND M. HARPER

**Emerson and Weed's Our Trees†**

Of the popular guides for the identification of trees, none is more attractively gotten up than this. To the fifth edition just out an introduction has been added, calling attention to the seasonal changes of trees. A full-page illustration is given to each species. Leaves, flowers and fruits have been photographed and a small inset view of the whole tree has been added. On the page facing the illustrations is the description calling attention to the distinguishing characteristics. Here related species not illustrated are sometimes mentioned, but the book is not intended to be complete in this respect. The arrangement and Latin names are those of Professor Sargent's Manual of the Trees of North America (with the ginkgo still in the Yew family);

* See Jour. Elisha Mitchell Sci. Soc. **33**: 117 (footnote). 1917.

† Emerson, Arthur I., and Weed, Clarence M. Our Trees, How to Know them. 5th edition, pp. xxi + 295, 149 illustrations. Philadelphia and London, J. B. Lippincott Co. 1918. Price $3.50 net.

Latin names of other standard works are also mentioned, but prominence is given to the English names. A number of introduced trees are included, such as European larch and yew, English and Scotch elm, sycamore and Norway maple, ailanthus, and others. Alfred Gundersen.

### Mosher's Grasses of Illinois

Dr. Edna Mosher's Grasses of Illinois (Bulletin No. 205 of the University of Illinois Agricultural Experiment Station) is the most notable contribution to the agrostology of the Middle West since the publication of Pammel, Ball and Scribner's Grasses of Iowa, and the first complete list of the grasses of the state since that of Lapham in 1857. In the sixty years since the appearance of Lapham's catalogue, the number of species known to exist within the limits of the state has almost doubled. The present publication lists 204 species, representing 63 genera. Many of these species are recent introductions, to which attention is here called for the first time. The author has very carefully verified all specimens cited, and has added some valuable comments on the economic side. The book is not a mere catalogue, but is prefaced by a brief and untechnical discussion of the structure of grasses that will make it of value as an introductory text-book. Each species is illustrated by a careful drawing, and the descriptions of genera are clear and accurate.

The bibliographies prefixed to each species differ somewhat from the accepted usage in that they are restricted to the *Illinois* history of the species, and might in this way lead to confusion. Dr. Mosher's practice of reducing her citations simply to the surname of the author and year of publication certainly economizes space, but is almost *too* concise. A beginner might not always understand that "Michaux '03" and "Britton '07" belong to different centuries.

A more serious departure from generally accepted usage is found in the failure of the key to recognize the division of the grass family into tribes. As a result, the system of classification becomes somewhat arbitrary and empirical, and the beginner runs the risk of not apprehending the natural relationships of the genera. Doubtless if the determination of a particular species in hand is the only end aimed at, the result may be attained more quickly by singling out some obvious but accidental character on which to base the process of dichotomy. To separate *Cenchrus*, for instance, from all other grasses because of its peculiar fruit may be the easiest way to identify it; but if the beginner as a result loses sight of the fact that *Cenchrus* has its exact place in a regular system of classification, and regards it as a sort of anomaly, then the work of the great post-Linnaean agrostologists has gone for naught, and we are relegated to the unsound and superficial methods of classification that prevailed in the time of the herbalists. It remained for Trinius and his successors to clear up the confused and mistaken ideas that prevailed as to the structure of the grass-flower, and make the *spikelet* the basis of all classification; and on this foundation modern agrostology solidly rests. To undo what has been done and invent a new system of classification founded on some other basis is to attempt a disastrous innovation. It is beside the point to argue that the beginner finds the natural system too difficult. If proper care is taken at first, it is as easy to learn scientific methods as unscientific. Is it more difficult for the student to apprehend the distinction between the two subfamilies Panicoideae and Poaoideae than it is to be asked to consider the tribe Hordeae as set off from all the rest of the family by the form of its inflorescence? There is a science of classification, just as there is a science of morphology; to ignore it in the one case and insist on it in the other will result in a fatal inconsistency, and in an inability to grasp the true meaning of scientific method.

J. C. NELSON.

## PROCEEDINGS OF THE CLUB

### APRIL 24, 1918

The meeting was held in the Museum building of the New York Botanical Garden at 3:30 P.M. Vice-president Barnhart presided. There were twenty-one persons present. The minutes of March 27 and April 9 were read and approved.

Mr. C. E. Foote, of Jackson, Mich., was nominated for membership.

The question of holding a meeting of the Club on the last Wednesday in May was discussed and left with Mrs. Britton, Chairman of the Program Committee for settlement.

Upon the motion of Mrs. Britton the Club voted to authorize the Treasurer to purchase with funds from the Underwood Fund a one thousand dollar registered U. S. Bond of the Third Liberty Loan issue.

Mr. C. E. Foote was elected to membership.

The scientific program was then carried out.

Dr. N. L. Britton read a paper on "A Brief Memorial of the late Dr. J. A. Shafer." This paper will be published in the *Jounral of the New York Botanical Garden.*

Dr. B. O. Dodge spoke briefly on the subject "Notes on Gymnosporangium." Dr. Dodge spoke of the curious situation existing at the New York Botanical Garden where abundant infections of the apples and hawthorns with *Gymnosporangium macropus* and *G. globosum* were found in 1917, while the alternate telial stages appear not to have been present on the red cedars in the immediate vicinity. On the other hand, *G. nidus-avis* and *G. clavipes* are very commonly present on the red cedars in the grounds while their aecidial stages were not found last year in the same region. The speaker reported on his studies on the origin of the teleutospores in *G. macropus*, *G. globosum*, *G. clavariaeforme* and *G. nidus-avis.* The spores do not arise from the terminal cells of the pseudo-parenchyma as reported by Blackman, Reed and Crabill and others. The terminal cells degenerate and spores are formed from buds growing out of penultimate cells.

The next number of the program "Exhibit of Early Spring Flowers" (Cultivated) was given by Mr. Kenneth Boynton.

Dr. F. J. Seaver exhibited a rare species of Ascomycete, *Haematelia.* This fungus will revive when moistened after being dried, in the same way that members of the Auriculaceae are known to do.

Adjournment followed.

B. O. Dodge,
*Secretary*

## May 14, 1918

The meeting was held at the American Museum of Natural History. The meeting was called to order at 8:20 P.M. with Miss Grace Stewart in the chair. There were ten persons present.

The scientific program consisted of a lecture on "A Brief History of the Classification of Flowering Plants" by Dr. A. Gundersen. The lecture was illustrated by lantern slides. An abstract by the lecturer follows.

"Theophrastus in the third century B.C. classified plants as trees, shrubs, half-shrubs and herbs. The sixteenth century herbalists mark the first definite progress. Lobelius separated plants with leaves having parallel veins from those with netted veins. Caesalpini made two main groups, woody plants and herbs, and secondary groups by fruit characters. Ray introduced the terms monocotyledons and dicotyledons as subdivisions of herbs. Tournefort was the first to make a clear exposition of genera.

" Linnaeus adopted a simple artificial system, but said it was only a thread of Ariadne, to help him find his way; the great aim of botany was to discover a natural system. Laurent de Jussieu in 1789 published descriptions of a hundred families; his grouping was improved by De Candolle. The work of Robert Brown and Hofmeister established main groups of the higher plants. After Darwin, the idea that classification should express evolution gradually became dominant. Bentham and Hooker, Eichler, and Engler aided in establishing groups of families, now called orders, hardly yet defined.

"The speaker quoted Scott's statement that the construction of a pedigree of plants is at present a pious wish. Considering the long time before a truly natural system can come, might not some of the confusion of varying systems be overcome by periodic agreement at least so far as plant families?"

Meeting adjourned.

B. O. Dodge,
*Secretary*

## NEWS ITEMS

A. O. Garret, head of the department of biology of the Salt Lake High Schools, is a field assistant in forest pathology, Bureau of Plant Industry, for the summer. He has been working in western Colorado, northeastern Utah, and southwestern Wyoming, investigating *Peridermium occidentale.*

Dr. N. L. Britton has received the following letter from a prisoner of war interned in Canada:

KAPUSKASING, ONT., CANADA, July the 13, 1918.

TO THE DEPARTMENT OF BOTANY, BRONX PARK, NEW YORK CITY.

*Dear Sir:* I send you this little plant for your kind advice. It grows to about 4 to 5 in. high, found in the bush near Amherst, N. S., and also near the Kapuskasing River. It seems to have a perennial root, with trifoliate leaves; spring alternately from its root-stalk. The roots are fibrous, thin, long and of yellow-brown color when fresh. They taste bitter and keep this bitter taste even when they are dry. Some men at Amherst boil and drink them like tea; they say it is a good remedy for certain ills. Would you kindly send me your worthy opinion on the matter and also the botanical name of the genus and the family to which it belongs. I am a gardener and therefore I take a great interest in plants. Yours faithfully,

PETER MAURER, Pr. of War, 2724
Kapuskasing, Ont.,
Canada.

The plant referred to, of which a drawing and description were appended, is *Coptis trifolia*, the gold-thread.

Professor Byron D. Halsted, one of the oldest members of the club, and since 1889 professor of botany at Rutgers College, died on August 28. He was born at Venice, N. Y., on June 7, 1852, and was known throughout the country for many contributions to various botanical journals. One of his most recent papers was in TORREYA for June, 1917, on "The weight of seeds as related to their number and position."

# The Torrey Botanical Club

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# OTHER PUBLICATIONS

OF THE

# TORREY BOTANICAL CLUB

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## (1) BULLETIN

A monthly journal devoted to general botany, established 1870. Vol. 44 published in 1917, contained 579 pages of text and 26 full-page plates. Price $4.00 per annum. For Europe, 18 shillings. Dulau & Co., 47 Soho Square, London, are, agents for England.

Of former volumes, only 24–44 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–44 three dollars each.

Single copies (30 cents) will be furnished only when not breaking complete volumes.

## (2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–15 are now completed; No. 1 of Vol. 16 has been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

DR. BERNARD O. DODGE
Columbia University
New York City

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BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873.

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# THE TORREY BOTANICAL CLUB




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NORMAN TAYLOR

Brooklyn Botanic Garden

Brooklyn, N. Y

# TORREYA

September, 1918

Vol. 18 No. 73

## NOTES ON THE FLORA OF BOULDER COUNTY, COLORADO

By T. D. A. Cockerell

The Flora of Boulder County has been recorded in a volume of 311 pages by Professor F. P. Daniels (Univ. of Missouri Studies, science series, vol. II, no. 2, 1911), who catalogues 486 genera and 1,225 species. Since the publication of this work about 27 genera and 76 species have been added, principally from the observations of Messrs. D. M. Andrews and E. Bethel. A few species have been deleted, but in round numbers the Boulder County list includes 1,300 species of flowering plants and pteridophytes. Comparing this with an area of similar size in Switzerland, we find a striking correspondence:

Boulder County. Area 751 square miles. 1,300 species.
Canton of St Gallen. Area 779 square miles. 1,295 species.

The Rocky Mountains are much more ancient than the Swiss alps, but this fact appears to have little or no influence on the composition of the present flora. The Swiss alps are heavily glaciated, while the Rocky mountains of Colorado are almost entirely bare; the mountains of Switzerland are also much more closely grazed than ours, and the lowlands are more extensively and intensively cultivated. These differences would lead us to expect a larger flora in a corresponding area in Colorado than in Switzerland.

In 1906 Rydberg recognized 2,912 species of seed plants and pteridophytes for the whole of Colorado; while in 1909 Schinz and Keller listed 2,460 for Switzerland, the area of which is of course much less.

The genera added to the Boulder County list are the fol-

[No. 8, Vol. 18 of Torreya, comprising pp. 157–176, was issued 7 September, 1918]

lowing: *Thelypteris*, *Polystichum*, *Notholæna*, *Marsilea*, *Eriophorum*, *Veratrum*, *Kochia*, *Norta*, *Hoffmanseggia*, *Diholcos*, *Phaca*, *Hedysarum*, *Callirhoë*, *Pediocactus*, *Chamaepericlimenum*, *Oreoxis*, *Phellopterus*, *Cymopterus*, *Navarretia*, *Asperugo*, *Myzorrhiza*, *Cucurbita*, *Leucelene*, *Brauneria*, *Coreopsis*, *Pericome*, *Nabalus*. Several of these, as the *Kochia*, *Norta* and *Asperugo*, are introduced plants, foreign to the native flora. *Norta altissima* (L.) Britton is a remarkable case. I first collected it in Boulder in July, 1915; now it is everywhere, one of the most abundant weeds. It is also to be seen in other parts of the west, as along the Union Pacific Railroad. There is some confusion about the Linnean name and Bonnier calls the plant *Sisymbrium pannonicum* Jacq. The British "London Catalogue" also uses this name. But the singular thing is the contrast between its behavior in this country and in Europe. It has been introduced in the British Islands, but remains a rare straggler, not established. Gaston Bonnier says that it is not found at any great altitude in the mountains; in France it occurs here and there, very rarely; in Belgium it is rare, and inconstant in the localities where it occurs; it is very rare in Switzerland. Why, then, has it taken our country by storm? *Asperugo procumbens* L. I collected in Boulder, May 8, 1916; but it has not spread to any extent, so far as I have oberved. A very interesting escape is *Colutea arborescens* L. I recently saw it among a lot of wild flowers gathered by Miss Constance Fenton in Sunshine cañon. On making inquiry, I found that Mr. D. M. Andrews knew of more than one place near Boulder where it grew without cultivation. The Sunshine cañon locality was many years ago the abode of a solitary individual, who introduced various trees. Without attempting to review all the additions and changes in the list I note a few which seem of more general interest, or of which I have personal knowledge.

*Quercus utahensis* (A. D.C.) Rydb. Boulder (G. W. Letterman, 1854); Sargent, Trees and Shrubs, vol. 2. (1913), p. 222. It is safe to say that this species does not occur wild in Boulder County; there was probably some error in labelling. We have no native oaks.

*Atriplex canescens* (Pursh) Nutt. White Rocks, July, 1918, with galls of *Asphondylia neomexicana* Ckll. The White Rocks locality, northeast of Boulder, was botanically discovered by Mr. D. M. Andrews, who kindly took me over the ground. It is the type locality of *Asplenium andrewsii* Nels., which we saw growing on the face of the cliff. The White Rocks consist of Laramie sandstone, outcropping for a considerable distance along the creek, and possessing a flora which is, on the whole, very distinct from that of the surrounding country or the foothills. The fauna also doubtless differs. In my short visit I caught a southern bee, *Sphecodogastra texana* (Cresson) the genus and species new to Boulder County. The rocks are gay with *Helianthus petiolaris* Nutt. in July, and there is an abundance of *Prunus besseyi* Bailey with fine fruits.* Among the additions to the local flora discovered here by Mr. Andrews are *Abronia* (*Tripterocalyx*) *micrantha* Gray and *Rumex venosus* Pursh.

Another limited locality with a special flora is about four miles north of Boulder, on the road to Lyons, where the Niobrara shale outcrops. Here the specially characteristic plant, new to the local list, is *Delphinium geyeri* Greene. Here also is a quantity of *Hedysarum pabulare* Nels., also new to the list. These two very different and locally unique stations would well repay intensive study, which should if possible include the animals as well as the plants.

*Aquilegia saximontana* Rydb. has been found by Mr. Andrews above Silver Lake.

*Camelina microcarpa* Andrz. The weed now common in Boulder is not *C. sativa*, as reported, but *C. microcarpa*. Dr. Rydberg, to whom a specimen was sent, agrees. Bonnier treats *microcarpa* as a subspecies of *sativa*.

*Rosa pratincola angustiarum* Ckll. Mr. Andrews found this on Wood Mountain, Sept, 3, 1914, and I noted that the fruits

*Mr D. M. Andrews has visited the exact locality of *Prunus prunella* Daniels, and finds the plants as described, but they are *P. besseyi*. W. F. Wight (Native American species of Prunus, p. 69) states that *P. prunella* is a form of *besseyi* with well marked leaf serrations. Rydberg, however, admits *P. prunella*, and places it in a different section from *P. besseyi*.

were dimorphic, depressed-globose or oblong. Where there are three fruits in a corymb, often two will be globose, with long peduncles, the third oblong. Some of the prickles are over 8 mm. long, and all are straight. I think this is a distinct species, *Rosa angustiarum.*

*Rosa pratincola setulosa* Ckll. will become *R. suffulta* f. *setulosa.*

*Hoffmanseggia jamesii* T. & G. was found by Mr. Andrews between Lafayette and Erie.

*Aragallus.* Our species are to be transferred to *Oxytropis,* and two new combinations appear to be necessary: *Oxytropis minor* (*Aragallus minor* (Gray) Ckll.), and *Oxytropis dispar* (*Aragallus dispar* Nels., *A. patens* Rydb.).

*Viola Rafinesquii* Greene is locally abundant at Boulder, but apparently has been introduced.

*Pediocactus Simpsoni* (Engelm.) Britt. & Rose is reported by Andrews from the high foothills north and south of Boulder, and the variety *minor* (*Echinocactus simpsoni minor* Engelm.) of the same from below Eldora.

*Chamaenerion spicatum* (Lam.) S. F. Gray f. *alba,* with white flowers, was found by me at Ward, 1917. The same variation (*alba* Hort..) is known in cultivation (cf. Standard Cyclop Horticulture).

*Oenothera strigosa* of the Boulder list is *O. cockerelli* de Vries.

*Mertensia secundorum* Ckll. does not seem to be the true *myosotifolia* Heller, from Red Cliff, nor can it well be *M. lateriflora* Greene, as Rydberg has it. I think it should be called *M. lanceolata* var. *secundorum.* The condition of affairs in the *M. lanceolata* group suggests the hybridization of two or more species, the ranges of which have come to overlap; but only experimental work can bring out the facts. Variability, with strongly heterozygous types, does not necessarily indicate hybridization; thus it exists in our district in *Ratibida columnifera,* which cannot well be suspected of any sort of bastardy.

*Solanum elaeagnifolium* Cav. was found by Andrews near Marshall; of course a stray.

*Castilleja sessiliflora* Pursh was collected at Boulder by Mr. E. Bethel, May, 1916. It has also been obtained since, and is locally common. It is not quite the same as the eastern plants the calyx being more deeply cleft above than below; it may be named var. or subsp. *betheli*. I consulted Mr. Osterhout. about the matter, and he found the same character in other specimens from various Colorado localities; near Windsor, Weld Co., Livermore in Larimer Co., and Julesburg. On the other hand, one from Wray, Yuma Co., near the Kansas border, appears to agree with eastern specimens.

*Helianthus grosseserratus* of the Boulder list is *H. coloradensis* Ckll. I now have in the garden *H. parishii* Gray, obtained by Mr. Theodore Payne near Sevenoaks, in the San Bernardino mountains, California. To my surprise, it is nearly identical with *coloradensis*. The involucral bracts are shorter, and the leaves tend to be a little more distinctly dentate; but the plants are essentially of the same type, and there would be no serious objection to calling our plant *H. parishii coloradensis*.* The Californian *parishii* grows taller, up to 15 feet. I thought this statement might be an exaggeration, but it is confirmed by Dr. H. M. Hall. The Californian plant also presents a more pubescent type, *H. parishii* f. *oliveri* (*H. oliveri* Gray), which seems to be wholly lacking in our region. It is perhaps related to a maritime environment. The *H. coloradensis* at Boulder has an additional color-form (f. *sulphurea*, nov.), with pale or sulphur-colored rays. It was found by Mr. Andrews. The color is the or (gold) of Gravereaux's color chart, while the typical form is his safran (saffron).

*Gymnolomia multiflora* (Nutt.) B. & H. Dr. S. F. Blake, in his admirable recent revision of *Viguiera*, shows that this plant is quite distinc tfrom the true *Gymnolomia*. It is the type of Nuttall's *Heliomeris*, but Dr. Blake refers it to *Viguiera*,

*Gaston Bonnier in his Flora of France, Switzerland and Belgium, and Hooker, in his Flora of the British Islands, retain the binomials for all the subspecies or races, a plan which has some advantages over that of trinomials, though it is too easily a source of confusion. Presumably a citation of the aggreate species is not to be taken as indicating necessarily the typical race, unless followed by "typica," or "s. str." Some compromise is necessary for convenience, as any system of nomenclature which expresses the actual facts in detail becomes too combersome for general use. The objection to recognizing two grades of species, each with binomials, is not so serious when there is a standard Flora in which all are described.

where with its allies it constitutes a group or section, distinguished by the absence of pappus and other characters. It is said to be a compact group of closely related species, well distinguished by habit and involucre. The group of *Viguiera* proper from which it arose appears to be extinct. All this should indicate a valid genus, and to it may be added the fact that in caustic potash the rays of *H. multiflora* turn bright red on the basal half. This is the color-reaction of the perennial sunflowers, but is not exhibited by the type species of *Viguiera*. Dr. Blake, in his prefatory remarks (Revis. Viguiera, p. 3), strongly objects to the use of such chemical tests in taxonomic work with composites, but I do not see why they are not as significant as various morphological data. I never proposed to use them alone. He objects that they cannot mean much, since a variety of unrelated genera agreed in their reaction. In this criticism he overlooked the fact that they agreed only in *not producing any red color*. After stating any morphological generic character, it could be added that numerous unrelated forms agreed in *not* possessing it. It is worth while to realize, through chemical tests, that things are not always what they seem. Thus the pure white rays of *Leucampyx newberryi* turn bright yellow in caustic potash, whereas ordinary white flowers, devoid of pigment, are unaffected.

The genus *Heliomeris*, limited and defined as a section by Blake, will stand as follows:

*Heliomeris multiflora* Nuttall.*

* Since writing the above, I have been able to make new studies of *Heliomeris multiflora* at Peaceful Valley, Colorado, altitude 8,000 ft. This is well above the zone of *Helianthus*, which was represented only by a single small *H. annuus lenticularis*, from an accidentally dropped seed close to the store. The following characters should be added to descriptions of *H. multiflora*. Acuminate ends of disc-bracts bright yellow; the bracts otherwise pure white, with a light but bright green keel down the back; but the outermost ones are also profusely speckled on the back with black (anthocyanin). Stigmatic branches pure orange. Rays emarginate at end; ray florets wholly without pistils.

Mixed with the typical form was a very interesting mut. *Apicalis*, nov.; with the apical third of the rays at full maturity creamy-white, abruptly contrasting with the bright yellow basal two-thirds. When the flowers first come out, the apical part is yellow, but a shade paler than the rest. This is very significant in relation to the patterns in the rays of *Helianthus*. The species of *Rudbeckia* show

*Heliomeris nevadensis* (*Gymnolomia nevadensis* Nelson, 1904).
*Heliomeris brevifolia* (*Gymnolomia brevifolia* Greene, 1913).
*Heliomeris longifolia* (*Gymnolomia longifolia* Rob. & Greenm., 1899).
*Heliomeris annua* (*Gymnolomia multiflora annua* Jones, 1895).
*Heliomeris hispida* (*H. multiflora hispida* Gray, 1853).
*Heliomeris hispida ciliata* (*Gymnolomia hispida* var. *ciliata* Rob. & Greenm. 1899).
*Heliomeris porteri* (*Rudbeckia porteri* Gray; *Gymnolomia porteri* Gray).
*Heliomeris obscura* (*Gymnolomia obscura* Blake, 1916).
*Arnica monocephala* Rydb. becomes *A. pedunculata* Rydb. f. *monocephala*.

BOULDER, COLORADO.

# THE HAWAIIAN SUMACH

## NENELEAU; *Rhus semialata* VAR. *sandwicensis* ENGLER

BY VAUGHAN MACCAUGHEY

In 1917 the author published an annotated list of the forest trees of the Hawaiian Archipelago, in the Bulletin of the Torrey Botanical Club (44: 145–157). In the Botanical Gazette (64: 89–114, Aug. 1917) he described in detail the unparalleled endemism of the Hawaiian flora, especially the arborescent flora, The present paper deals with an endemic tree, the Hawaiian sumach, the sole native representative of a large and important tropical family. At present there is no detailed account of this tree in the literature. The Hawaiian sumach is a small tree,

white patches on the rays is fading, but these are irregular. In the palest forms of *Helianthus annuus* obtained by my wife in her cultures, the rays are at first light yellow throughout, but at full maturity are pale yellowish basally, shading into white apically; but the transition is not abrupt as in the *Heliomeris.*

The insect-visitors of *H. multiflora* were noted, and consisted of the following bees: *Bombus bifarius* Cresson, *Panurginus parteræ* Ckll., *Halictoides cryx* Vier., *Halictus cressoni* Rob., and the honey-bee; also the fly *Eristalis latifrons* Lev., and the plant-bug *Ligyrocaris contractus* Say. *Phacelia* and *Monarda* at the same place were visited by almost entirely different sexes of bees, belonging to other genera in the main: e.g. *Anthophora* on *Monarda*, *Osmia* and *Anthidium* on *Phacelia* fairly common here and there throughout the lowlands, and resembling in its general characters the familiar sumachs of the continental United States. Its most remarkable feature is its geographical distribution, which affords one more clue to the primitive floral connections of Hawaii with southwestern Asia. The semi-alate sumach extends from the mountains of the Himalayas to the mountains of Hawaii.

The sumach family, Anacardiaceae, comprises 58 genera and about 420 species. It is mostly tropical, with Malaya as the largest center of distribution. There are a few extra-tropical genera, of which *Rhus* is typical. The family is represented in Hawaii by a single endemic variety and seven or more introduced species. The latter include the mango tree; the wi, *Spondias dulcis;* the Tahiti apple, *Spondias lutea;* the cashew nut, *Anacardium occidentale; Semecarpus anacardium;* the pepper tree, *Schinus molle;* and the Christmas-berry tree, *Schinus terebinifolius.*

*Rhus* is the largest genus of the family and includes 120 species and subspecies. It is most abundant in South Africa, but also occurs throughout the world. Several species are native to the Fiji and the Society Islands. The Japanese sumach, *Rhus vernix,* has been introduced recently into Hawaii. The foliage and bark of most species are rich in tannin and are used for tanning leather. Certain oriental species yield lacquer and vegetable wax. Hawaii is extremely fortunate in having no poisonous rhuses in her flora; poison ivy is unknown. It is noteworthy that there are no plants in the Hawaiian flora that are poisonous to the touch.

The Hawaiian sumach is *Rhus semialata* Murray var. *sandwicensis* Engler. The species is a small tree, indigenous to the Himalaya Mountains, at 3,000–6,000 ft. The variety, which is endemic to the Hawaiian group, differs from the species only in having the rachis of the leaf *not* winged. The species is not known in the other islands of Polynesia. A query may be raised as to whether the uniformly wingless condition of the Hawaiian variety is of varietal or specific status. It is difficult to explain the presence of this tree in the Hawaiian islands. The primitive Hawaiians knew it by the name of *neuleau* or *neleau.*

They are not known to have had any special uses for the tree, and beyond question did not introduce it from the South Pacific, as they did many other useful Polynesian plants. It has probably occupied the Hawaiian Islands since very remote times, in which the topography of the Central Pacific was very different from that of the present era. There may have been *extensive land-connections with Asia;* there is much biological evidence to support this hypothesis.

The tree is small and flat-crowned, 6–25 ft. high. It is often a tall shrub, with one or more trunks and a few bold, wide-spreading branches. It is a rapid grower, under favorable conditions. The terminal twigs are often 40–60 cm. long. The roots are fleshy. Like many other species of *Rhus* it often sends up numerous shoots from the roots, and forms dense clumps. In early times, before the lowlands were invaded with foreign vegetation, these clumps were much more extensive and numerous than at present. The branches are so pithy and brittle that they are often more or less mutilated. The crown usually contains man often more or less mutilated. The crown usually contains many dead branches and twigs.

The trunk is 20–35 cm. in diameter, and smooth-barked. The sap is milky, viscid, and resinous. The pith becomes pale brown. The wood is soft, very light in weight, tough, yellowish gray in color, with darker streaks. The sapwood is lighter than the heartwood. The grain is rather coarse, but the wood takes a smooth polish. It was formerly used by the planters for ox-plows. It weighs about 27 lbs. per cu. ft. Its specific gravity is about .43. The pith rays are fine and inconspicuous. The ducts are scattered through the seasonal rings, *i. e.*, diffuse porous.

The twigs are stout, pithy, and brittle. They stand out at angles of 30–90 from the branches. They are leafy at the tips and bare below. They are covered throughout with thin, smooth, brown bark. The younger twigs are often tunneled by borers and ants. The lenticels are numerous, large, corky, prominent, and lighter brown than the bark. The petiole scars are large, prominent, heart-shaped, with prominent bundle scars. The petiole scars are persistent and show plainly on the old branches. On the older branches the bark becomes purplish brown. The lenticels break into large, light-colored stripes, which form a showy color pattern against the darker bark. The ends of the branches are covered with rusty brown wool. The leaves tend to form terminal masses or rosettes on the branches. The individual leaves stand nearly at right angles to the twigs.

The terminal buds are 4–8 mm. long, cylindric, blunt, naked, and consisting of one leaf rudiment much larger than the other leaf rudiments which are clustered at its base. All parts are densely covered with fine brown tomentum. The leaf segments of the rudiments are folded conduplicately.

All parts of the young leaves, especially the petiole, midrib and undersurface are strongly suffused with red. The half-matured leaves have bright red petioles and midrib, the blade is vivid green. The leaflets are roughish pubescent above and covered below with fine whitish wool.

The leaves are alternate, evergreen. The mature leaves are 24–36 cm. long and 20–24 cm. wide, obovate, compound, impari-pinnate, with 2–6 (usually 5–6) pairs of petioled leaflets and 1 terminal leaflet. The top-most pair of leaflets are longest; the terminal leaflet is the largest.

The midrib is 10–30 cm. long, terete, not margined, petiolate in the lower third or fourth. The petiole is terete, stout, angled and much enlarged at its base, and conspicuously excavated above, making a pocket for the axillary bud. The basal part of the petiole is a motile region or pulvinus, for the proper orientation of the blade. There are no stipules. The leaflets are crowded so as to overlap. They are ovate-lanceolate or oblong, with apex more or less acute, base rounded or broadly cuneate, and margin coarsely crenate serrate. They are 5–15 cm. long and 2.5–8 cm. wide, tough, semi-coriaceous, almost sessile or short stalked. The venation is pinnate; the veins are prominent below, and impressed above. The midrib of the leaflet is strong, sometimes lighter and sometimes darker than the blade. The lateral veins are numerous, parallel, and boldly forking toward their extremities. The leaflets are subglabrous above and downy underneath. The old leaves are more or less marked with yellow, especially around the margins of the leaflets. They finally change to a bright rich sumach red, against which the main veins remain vivid green.

The Hawaiian sumach is very showy when in flower. The flowers are polygamous; in most species of *Rhus* they are dioecious by abortion. They are small, yellowish or creamy white. They are arranged in panicles which are very large, dense, terminal, compound, and broad, 30 cm. long, and many-flowered. The calyx is deeply 5-lobed, imbricate, 1 mm. diam., tomentose, persistent. The disk surrounding the base of the free ovary is coherent with the base of the calyx. The petals are 5, 2 mm. long, longer than the calyx, imbricate, obovate, glabrous or ciliate, inserted under the margin of the disk, opposite its lobes, and deciduous.

The stamens are 5, inserted on the margin of the disk, alternate with the petals. Filaments subulate, very short; anthers ovate, obtuse, often small or abortive in the female flowers, introrse, 2-celled, attached by the back and longitudinally dehiscent.

The ovary is ovate or subglobose, sessile. Styles 2–3, short, terminal or sometimes united; stigmas capitate. Ovule solitary, anatropous, suspended from an erect funiculus which rises from the base of the ovary. Fruit a small dry drupe, ovoid, globose, or compressed, and 3–4 mm. diam. The outer coat is thin, dry, and tomentose. The pulp is more or less resinous, similar to the Japanese commercial wax. The stone is crustaceous or bony, and thin. The seed is ovate or reniform, commonly transverse, without albumen; cotyledons foliaceous, generally transverse; radicle long, uncinate, laterally accumbent. The fruits of the species are used by the Himalayan hill folk as a remedy for colic. The old fruit clusters are persistent, dry, compact, and with reflexed branchlets, on naked twigs. They are 10–15 cm. long and 6–10 cm. wide.

The Hawaiian sumach occurs on all the larger islands of the archipelago at elevations of 600–2,000 ft., throughout the lowland and lower forest zones, in both dry and wet situations. It grows in more or less isolated clumps, and never forms pure stands. It is intolerant of shade, and is not able to withstand the competition of such forms as the introduced guava, lantana, etc. It is not distinctively a tree of dry and barren soil, as are so many mainland species of *Rhus*. Typical stations are: *Kauai*, Makaweli, Waimea; *Oahu*, Nuuanu, Heeia, Kahuku, Kaena; *Maui*, Kaupo, Hana, Haiku; *Hawaii*, Hilo, Kau, North Kona. It has suffered greatly from the ravages of cattle, goats, sheep, and such foreign pests as Hilo grass and guava.

HONOLULU

## CHARLES KEENE DODGE

BY KENNETH K. MACKENZIE

CHARLES KEENE DODGE, whose death took place on March 22, 1918, was one who took the keenest delight in the study of systematic botany and in the life of observation which goes with it. He was a true botanist and lover of nature and one who had nothing in common with the hosts of chemists and physicists who have invaded the domains of botany and whose papers make the botanical magazines unreadable to those really interested in living plants and their relationships.

Born on April 26, 1844, in the township of Blackman, Jackson County, Mich., on a farm five miles north of the city of Jackson, Mich., he lived in Michigan all his life with the exception of some two years spent in the west and in the south; and he was buried in his native State at Lakeside Cemetery, Port Huron.

His education was received in the country and city schools of Michigan. In 1865–1866, he attended the Union School at Ann Arbor. After graduating, he entered the University of Michigan in the fall of 1866, where he pursued a classical course. His graduation took place in 1870.

After graduating, Mr. Dodge taught school in Rockland, Mich., for two years and also at Hancock, Mich., for two years. During this time he took up the study of the law and in 1875 he was admitted to the bar at Port Huron, Mich.

Mr. Dodge continued to reside in Port Huron, Mich., from 1875 until his death, with the exception, as before stated, of some two years spent in the west and south. He practiced law actively up to September, 1893, at which time he was appointed to the United States customs, with which he continued until his death.

His marriage to Miss Millie Burns took place on August 4, 1897, and he is survived by her.

Mr. Dodge's interest in botany began about 1875. Before 1888, he had very few specimens. In 1893, he became dissatisfied with his collection and "threw most everything out of the back window and began over again." He was encouraged to proceed in his work first by the late Professor C. F. Wheeler, who impressed on him the great desirability of systematic collecting, and later by Professor C. K. Davis and Dr. A. G. Ruthven, of the Museum of Zoölogy at Ann Arbor. At first, he indulged in exchanging specimens and building up a general herbarium, but after a time came to the conclusion that he could do more effective work by confining himself to Michigan and adjacent Ontario. This he proceeded to do, at first confining his efforts largely to St. Clair County, Michigan, and Lambton County, Ontario. His love of botany increased with advancing years and it was so great that at times he would regularly work far into the night every other night in order that he might have time the next day for his botanical labors. He specialized more and more in the higher plants of Michigan and in this field secured a very extensive and accurate knowledge and by far the widest field experience.

Of later years, he extended his field of operations and made numerous collecting trips to the Northern Peninsula of Michigan, and took great pleasure in the numerous interesting plants he found there. Visits to Chippewa, Luce, Alger and Schoolcraft counties were followed by visits further west to Marquette and Houghton counties, and all resulted in interesting and valuable collections. More lately, too, he made trips to Berrien County in the extreme southwestern part of the State, and added materially to the knowledge of the Michigan flora in these trips. New and rare plants always were a source of great pleasure to him. Finding *Streptopus longipes* in great abundance in northern Michigan;

becoming acquainted with the peculiar *Adenocaulon bicolor* in the field; finding that the *Pellaea* of Michigan was *Pellaea glabella* and not *Pellaea atropurpurea*, and seeing the distinctions between the two, are illustrations of what gave him genuine pleasure.

Mr. Dodge was an easy writer and very agreeable correspondent, but confined his publications to a number of plant lists. Those known to me are as follows:

1. List of plants of Saint Clair County, Michigan, and Lambton County, Ontario, published in 1899, in the Report of the State Horticultural Society of Michigan, pp. 231–314, referred to by Mr. Dodge as "my first effort."

2. Catalog of Plants in a Biological Survey of the Sand Dune Region of the South Shore of Saginaw Bay, Michigan, pp. 65–120, published in 1911 by Michigan Geological and Biological Survey, referred to by Mr. Dodge as "my second list."

3. Results of the Mershon Expedition to the Charity Islands, Lake Huron, pp. 173–190, published in 1911 in Report of Michigan Academy of Science.

4. Plants of Point Pelee, Ontario, published in 1914 in Ottawa, Ontario, by Department of Mines, pp. 1–131.

5. Flowering Plants, Ferns and Fern allies growing without cultivation in Lambton County, Ontario, published in 1914 in the Report of Michigan Academy of Science, pp. 132–200.

6. Plants of Mackinac Island, Michigan, in the Report of Michigan Academy of Science.

7. Ferns of Michigan.

8. Plants of Marquette County, Michigan (not yet printed).

It is a satisfaction to know that Mr. Dodge's herbarium has been deposited at Ann Arbor, Mich., so that the results of his labors will be available to other Michigan students.

New York

# NOTES ON THE FLORA OF LAKE LABISH, OREGON

By J. C. Nelson

The collector who undertakes to make a regional map of his district to show the zonal distr bution of its flora, finds his efforts baffled sooner or later by the presence of areas which show a wide departure from the normal conditions to be looked for in the territory. It is to be expected that changes in the geological horizon will be accompanied by corresponding changes in the flora; even slight variations of soil or surface-contour will mean a similar change in the plant-life. Few regions of any extent will maintain uniform conditions throughout; and especially in the West, where the geologic processes have been more abrupt and violent than in the East, the unexpected is always likely to happen. I can still recall how in my early collecting in northern Kentucky the local flora was modified by the presence of the terminal moraine of the glacial period, which crosses the Ohio River at many points, and extends several miles inland. Many species that were common on these deposits were never found in the unglaciated area in immediate contact, and showed no disposition to extend their range, although no obstacle existed beyond the change of soil-content. Clay, loam, sand, rocks and humus each have their appropriate flora; the degree of moisture, of sunlight and of cultivation all have their effect, and the study of any local flora soon becomes a question of topography.

We have here in Marion County, Oregon, an area that well illustrates the difficulty of making a regional catalogue. Occurring as it does without warning, in the midst of totally different surface conditions, it presents some very interesting problems, and deserves closer study than it has hitherto received. The area in question is locally known as Lake Labish (a corruption of "la biche," probably given by the early French-Canadian settlers on account of the abundance of deer in this section), but is no longer a lake in the usual meaning of the term. It is a long narrow depression, extending in a general southwesterly direction for about ten miles, from a point on Pudding River some six miles east of the town of Gervais to the Willamette River near Wheatland. It is only a few hundred feet wide at the northern end, but broadens gradually until it reaches a width of about a quarter of a mile. At no point is its surface more than thirty feet below the level of the surrounding country, and toward the northern end not more than ten feet. Its origin is somewhat doubtful; but I am inclined to think that it represents an old river-channel. At the point where it approaches Pudding River, the latter stream makes a sharp bend to the north, and may have been turned from its original channel by some slight local upheaval, or even by the agency of beavers, which were at one time very abundant in this basin.

Within the memory of the present generation the lake was an actual body of water; but extensive drainage operations have drawn this off in the direction of the Willamette until there is standing water only at the northern end, which remains an almost impenetrable tangle of brush and hydrophytic vegetation. The drained area affords a deep black peaty soil of almost inexhaustible fertility, and is largely devoted by Japanese market-gardeners to the production of onions.

This drainage and cultivation has tended to destroy the original vegetation, and the region is rapidly losing its characteristic flora. It seems to have been discovered botanically by that pioneer collector, Thomas Howell, who refers to it frequently in his Flora of Northwest America; but of recent years it has not received the attention which it deserves.

In an attempt to verify Howell's work, and to become as familiar as possible with the rapidly-vanishing flora before it is entirely extinct, I have explored the whole area of the original lake-bed, and have secured specimens of a number of plants that so far as I know are not found elsewhere in this county—some perhaps not in the State. The following selections from the list may serve to indicate the surprising character of the flora. It will be observed that we have here a strange conglomeration of maritime and mountain species, assembled in a region remote from either habitat; and the problem of how they found their way into this district is one that still awaits an answer.

1. *Equisetum littorale* Kuhlewein. This species, according to Piper and Beattie in the Flora of the Northwest Coast, has been previously reported on this coast only from British Columbia, but is of wide distribution both in this country and Europe, and is possibly to be regarded as a hybrid.

2. *Typha angustifolia* L. Not mentioned by Piper & Beattie in the work just cited, but abundant at Eugene, seventy miles to the south. Another species of very wide distribution. Some of the Lake Labish specimens are fully typical, and others seem to represent intergrades between this species and *T. latifolia;* but the narrower spike is maintained in all of them.

3. *Agrostis oregonensis* Vasey. According to Howell this occurs "in moist meadows about the foot of Mt. Hood, Oregon"; but in Hitchcock's revision of the genus (U. S. Dept. Agr. Bur. Pl. Ind. Bull. 68:46) it is reported from several stations in Washington, and from Salmon Prairie, Clackamas County, Oregon. What Howell called "*A. attenuata* Vasey" seems to be the same species.

4. *Phragmites communis* Trin. This cosmopolite might with safety be included in the flora of almost any district in the Temperate Zone, but seems to have escaped notice west of the Cascades. It is common in marshes along the lower Columbia in Clatsop County, Oregon.

5. *Carex dives* Holm. A rare species, which I have collected at only one other station, on the south side of Mount Hood, at 4,000 feet elevation.

6. *Carex interior* Bailey. This has perhaps been confused with *C. stellulata* Good., of which Kukenthal makes it a variety (var. *scirpoides* (Schkuhr) Carey).

7. *Carex aperta* Boott. Common along the Columbia river-bottoms in the region about Portland, where it is used for hay. Howell's "*C. bovina*." Widely distributed in Washington, but not previously reported from western Oregon except as above.

8. *Carex prairea* Dewey. Widely distributed in North America, but usually in limestone areas, which do not occur in any part of the Willamette Valley. Not reported from Oregon, unless Howell's "*C. teretiuscula* Good. var. *prairea* Britton" is identical.

9. *Juncus uncialis* Greene. A tiny plant—as its name indicates, never over an inch high. The type-locality is in California. Piper in the Flora of Washington reports it from Falcon Valley in Klickitat County, but it is not mentioned in the Flora of the Northwest Coast, and would therefore appear not to have been found west of the Cascades. Howell states the range (under *J. triformis* Engelm. var. *uniflorus* Engelm.) as "Oregon to California."

10. *Salix Geyeriana* Anderss. A rare species. It has been reported from other stations in the county, but remains unconfirmed.

11. *Betula Hallii* Howell. The exact status of this species is still in doubt. Howell's type-specimen was collected at Lake Labish. Piper was inclined for a time to refer it to *B. glandulosa* Michx.—a much smaller shrub, not exceeding 1 m. in height, while the Lake Labish form is a small tree, reaching at least 6 m.—but recently he seems disposed to accept Howell's species as valid. Mr. J. F. Macbride of the Gray Herbarium says that my specimens are closely matched by *B. pumila* L. var. *glandulifera* Regel, which may prove to be the final disposition of this puzzling form.

12. *Myosurus major* Greene. Originally collected in California, and reported from Washington, but not recognized by Howell.

13. *Ranunculus arvensis* L. Evidently introduced since the region came under cultivation, but not reported from any other station in Oregon.

14. *Caltha asarifolia* DC. Piper & Beattie give the range as "Alaska to Oregon, along the coast"; and there is no other report of it from inland districts. If Howell knew it at all, he seems to have taken it for *C. palustris* L., which it much resembles.

15. *Heuchera chlorantha* Piper. The author of this species now regards it as distinct from *H. cylindrica* Dougl., and the statement is made in the Flora of the Northwest Coast that it is "not rare"; but I have had no other report of it from this county.

16. *Comarum palustre* L. Abundant in the Labish area, but I have been unable to find it elsewhere.

17. *Epilobium franciscanum* Barbey. Generally regarded as a maritime species. The Labish plant may possibly be *E. cinerascens* Piper, recently published in the Proc. Biol. Soc. Wash. (31:75, June 29, 1918), the type being from Douglas County, Oregon.

18. *Ledum columbianum* Piper. A common shrub of the sand-dunes along the coast, but I can find no other report of it from the interior.

19. *Menyanthes trifoliata* L. Like *Comarum*, this is abundant in the lake-bed, and is widely distributed throughout North America, but I have failed to find it elsewhere in this county, except at considerable elevations in the mountains.

20. *Scutellaria galericulata* L. Another species of wide distribution, that has been reported from west of the Cascades only from Mt. Constitution on the San Juan Islands in Puget Sound.

*Senecio oreganus* Howell, the type-specimen of which was collected "in marshes bordering Lake Labish," seems to be simply a form of *S. exaltatus* Nutt.—a rare species in the Willamette Valley, but occasionally found in other localities.

An interesting feature of the Labish flora is the abundance of *Solanum Dulcamara* L. in the tangled thickets occupying the uncleared area. The plant does not seem to occur on the shores bordering the lake, and it is hard to understand how an evident introduction could have become so thoroughly established at such a distance from any spot where it might have been cultivated.

It will be seen from the above list that we have in the Lake Labish basin an aggregate of species of widely different range, that have come together here in a surprising and unexplainable way. Since the whole region will doubtless be soon brought under cultivation, and the distinctive flora will disappear, it seems worth while to offer this record for publication.

Salem, Oregon

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BY

NORMAN TAYLOR

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# TORREYA

October, 1918

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## SOME BOTANICAL NOTES FROM "THE CRUISE OF THE CORWIN"

By John Muir

In 1881 John Muir accompanied the "Corwin's" expedition in search of the "Jeannette" to the islands in Bering Sea and off the coast of Siberia. His account of that trip, in the form of a Journal, has been recently published and contains a fascinating account of a little-known region.*

The greater part of the volume appears now for the first time and will prove to all interested in that region the best account of it that one can find. In the Appendix is printed Muir's account of glaciation and "Botanical Notes." Part of this, without the author ever having seen the proofs was printed as a Treasury Department Document and is now practically unknown. The editor has added to this Muir's report on the flora of Herald Island and Wrangell Land which "remains after thirty-six years, the only one ever made on the vegetation of these remote Arctic regions." All of the book is well worth reading and the reprinting of the botanical section of the Appendix, through the courtesy of the publishers, makes available to our readers that part of the volume which relates to plants.—N. T.

### Introductory

The plants named in the following notes were collected at many localities on the coasts of Alaska and Siberia, and on St. Lawrence, Wrangell, and Herald Islands, between about latitude 54° and 71° N., longitude 161° and 178° W., in the course of short excursions, some of them less than an hour in length. Inasmuch as the flora of the arctic and subarctic regions is nearly the same everywhere, the discovery of many species new to science was not to be expected. The collection, however, will no doubt be valuable for comparison with the plants of other regions. In general the physiognomy of the vegetation of the polar regions resembles that of the alpine valleys of the

* Muir, J. The Cruise of the Corwin. Journal of the Arctic Expedition of 1881 in search of DeLong and the Jeannette. Edited by W. F. Bade. Pp. 1–279. Houghton Mifflin Company, Boston, 1917. Price $2.75. The following reprint from this volume is possible through the courtesy of the publishers.

[No. 9, Vol. 18 of Torreya, comprising pp. 177–196, was issued 29 October 1918]

temperate zones; so much so that the botanist on the coast of Arctic Siberia or America might readily fancy himself on the Sierra Nevada at a height of ten to twelve thousand feet above the sea.

There is no line of perpetual snow on any portion of the Arctic regions known to explorers. The snow disappears every summer, not only from the low, sandy shores and boggy tundras, but also from the tops of the mountains, and all the upper slopes and valleys with the exception of small patches of drifts and avalanche-heaps hardly noticeable in general views. But though nowhere excessively deep or permanent, the snow-mantle is universal during winter, and the plants are solidly frozen and buried for nearly three fourths of the year. In this condition they enjoy a sleep and rest about as profound as death, from which they awake in the months of June and July in vigorous health, and speedily reach a far higher development of leaf and flower and fruit than is generally supposed. On the drier banks and hills about Kotzebue Sound, Cape Thompson, and Cape Lisburne, many species show but little climatic repression, and during the long summer days grow tall enough to wave in the wind, and unfold flowers in as rich profusion and as highly colored as may be found in regions lying a thousand miles farther south.

## Unalaska

To the botanist approaching any portion of the Aleutian chain of islands from the soutward during the winter or spring months, the view is severely desolate and forbidding. The show comes down to the water's edge in solid white, interrupted only by dark, outstanding bluffs with faces too steep for snow to lie on, and by the backs of rounded rocks and long, rugged reefs beaten and overswept by heavy breakers rolling in from the Pacific, while throughout nearly every month of the year the higher mountains are wrapped in gloomy, dripping storm-clouds.

Nevertheless, vegetation here is remarkably close and luxuriant, and crowded with showy bloom, covering almost every foot of the ground up to a height of about a thousand feet above the sea—the harsh trachytic rocks, and even the cindery bases of the craters, as well as the moraines and rough soil-beds outspread on the low portions of the short, narrow valleys.

On the twentieth of May we found the showy *Geum glaciale* already in flower, also an arctostaphylos and draba, on a slope facing the south, near the harbor of Unalaska. The willows, too, were then beginning to put forth their catkins, while a multitude of green points were springing up in sheltered spots wherever the snow had vanished. At a height of four or five hundred feet, however, winter was still unbroken, with scarce a memory of the rich bloom of summer.

During a few short excursions along the shores of Unalaska Harbor, and on two of the adjacent mountains, towards the end of May and the beginning of October, we saw about fifty species of flowering plants—empetrum, vaccinium, bryanthus, pyrola, arctostaphylos, ledum, cassiope, lupinus, geranium, epilobium, silene, draba, and saxifraga, being the most telling and characteristic of the genera represented. *Empetrum nigrum*, a bryanthus, and three species of vaccinium make a grand display when in flower, and show their massed colors at a considerable distance.

Almost the entire surface of the valleys and hills and lower slopes of the mountains is covered with a dense, spongy plush of lichens and mosses similar to that which covers the tundras of the Arctic regions, making a rich green mantle on which the showy, flowering plants are strikingly relieved, though these grow far more luxuriantly on the banks of the streams where the drainage is less interrupted. Here also the ferns, of which I saw three species, are taller and more abundant, some of them arching their broad, delicate fronds over one's shoulders, while in similar situations the tallest of the five grasses that were seen reaches a height of nearly six feet, and forms a growth close enough for the farmer's scythe.

Not a single tree has been seen on any of the islands of the chain west of Kodiak, excepting a few spruces brought from Sitka and planted at Unalaska by the Russians about fifty years ago. They are still alive in a dwarfed condition, having made scarce any appreciable growth since they were planted.

These facts are the more remarkable, since in southeastern Alaska, lying both to the north and south of here, and on the many islands of the Alexander Archipelago, as well as on the mainland, forests of beautiful conifers flourish exuberantly and attain noble dimensions, while the climatic conditions generally do not appear to differ greatly from those that obtain on these treeless islands.

Wherever cattle have been introduced they have prospered and grown fat on the abundance of rich nutritious pasturage to be found almost everywhere in the deep, withdrawing valleys and on the green slopes of the hills and mountains, but the wetness of the summer months will always prevent the making of hay in any considerable quantities.

The agricultural possibilities of these islands seem also to be very limited. The hardier of the cereals—rye, barley, and oats—make a good, vigorous growth, and head out, but seldom or never mature, on account of insufficient sunshine and overabundance of moisture in the form of long-continued, drizzling fogs and rains. Green crops, however, as potatoes, turnips, cabbages, beets, and most other common garden vegetables, thrive wherever the ground is thoroughly drained and has a southerly exposure.

## St. Lawrence Island

St. Lawrence Island, as far as our observations extended, is mostly a dreary mass of granite and lava of various forms and colors, roughened with volcanic cones, covered with snow, and rigidly bound in ocean ice for half the year. Inasmuch as it lies broadsidewise to the direction pursued by the great ice-sheet that recently filled Bering Sea, and its rocks offered unequal resistance to the denuding action of the ice, the island is traversed by numerous ridges and low, gap-like valleys all trending in the same general direction. Some of the lowest of these transverse valleys have been degraded nearly to the level of the sea, showing that if the glaciation to which the island has been subjected had been slightly greater, we should have found several islands here instead of one.

At the time of our first visit, May 28, winter still had full possession, but eleven days later we found the dwarf willows, drabas, erigerons, and saxifrages pushing up their buds and leaves, on spots bare of snow, with wonderful rapidity. This was the beginning of spring at the northwest end of the island. On July 4 the flora seemed to have reached its highest development. The bottoms of the glacial valleys were in many places covered with tall grasses and carices evenly planted and forming meadows of considerable size, while the drier portions and the sloping grounds about them were enlivened with gay, highly colored flowers from an inch to nearly two feet in height, such as *Aconitum Napellus* L., var. *delphinifolium* Ser., *Polemonium coeruleum* L., *Papaver nudicaule* L., *Draba alpina* L., and *Silene acaulis* L., in large, closely flowered tufts, as well as andromeda, ledum, linnaea, cassiope, and several species of vaccinium and saxifraga.

## St. Michael

The region about St. Michael is a magnificent tundra, crowded with Arctic lichens and mosses, which here develop under most favorable conditions. In the spongy plush formed by the lower plants, in which one sinks almost knee-deep at every step, there is a sparse growth of grasses, carices, and rushes, tall enough to wave in the wind, while empetrum, the dwarf birch, and the various heathworts flourish here in all their beauty of bright leaves and flowers. The moss mantle for the most part rests on a stratum of ice that never melts to any great extent, and the ice on a bed rock of black vesicular lava. Ridges of the lava rise here and there above the general level in rough masses, affording ground for plants that like a drier soil. Numerous hollows and watercourses also occur on the general tundra, whose well-drained banks are decked with gay flowers in lavish abundance, and meadow patches of grasses shoulder-high, suggestive of regions much farther south.

The following plants and a few doubtful species not yet determined were collected here:—

*Aspidium fragrans* Sw.
*Woodsia ilvensis* (L.) R. Br.
*Eriophorum capitatum* Hos.
*Carex vulgaris* (Fries) Willd. var. *alpina.*
*Lloydia serotina* (Sweet) Reichenb.
*Tofieldia coccinea* Richards.
*Betula nana* L.
*Alnus viridis* DC.
*Polygonum alpinum* All.
*Arenaria lateriflora* L.
*Stellaria longipes* Goldie.
*Silene acaulis* L.
*Anemone narcissiflora* L.
" *parviflora* Michx.
*Caltha palustris* L. var. *asarifolia* Rothr.
*Corydalis pauciflora.*
*Draba alpina* L.
" *incana* L.
*Eutrema arenicola* Richards.
*Saxifraga nivalis* L.
" *hieracifolia* Waldst. & Kit.
*Rubus Chamaemorus* L.
" *arcticus* L.
*Potentilla nivea* L.
*Dryas octopetala* L.
*Oxytropis podocarpa* Gray.
*Astragalus alpinus* L.
*Astragalus frigidus* Gray var. *littoralis.*
*Lathyrus maritimus* Bigel.
*Epilobium latifolium* L.
*Cassiope tetragone* (D. Don.) Desv.
*Andromeda polifolia* L.
*Loiseleuria procumbens* Desv.
*Vaccinium Vitis-Idaea* L.
*Arctostaphylos alpina* Spreng.
*Ledum palustre* L.
*Diapensia lapponica* L.
*Armeria vulgaris* Willd.
*Primula borealis* Duby.
*Polemonium coeruleum* L.
*Mertensia paniculata* Desv.
*Pedicularis sudetica* Willd.
" *euphrasioides* Stev.
" *Langsdorffi* Fisch. var. *lanata* Gray.
*Pinguicula villosa* L.
*Linnaea borealis* Gronov.
*Valeriana capitata* (Pall.) Willd.
*Saussurea alpina* DC.
*Nardosmia frigida* Hook.
*Senecio frigidus* Less.
" *palustris* Hook.
*Arnica angustifolia* Vahl.
*Artemisia arctica* Bess.
*Matricaria inodora* L.

## Golofnin Bay

The tundra flora on the west side of Golofnin Bay is remarkably close and luxuriant, covering almost every foot of the ground, the hills as well as the valleys, while the sandy beach and a bank of coarsely stratified moraine material a few yards back from the beach were blooming like a garden with *Lathyrus maritimus,* *Iris sibirica*, *Polemonium coeruleum*, etc., diversified with clumps and patches of *Elymus arenarius*, *Alnus viridis*, and *Abies alba*.

This is one of the few points on the east side of Bering Sea where trees closely approach the shore. The white spruce occurs here in small groves or thickets of well-developed, erect trees fifteen or twenty feet high, near the level of the sea, at a distance of about six or eight miles from the mouth of the bay, and gradually becomes irregular and dwarfed as it approaches the shore. Here a number of dead and dying specimens were observed, indicating that conditions of soil, climate, and relations to other plants were becoming more unfavorable, and causing the tree-line to recede from the coast.

The following collection was made here July 10:—

*Aspidium spinulosum* Sw.
*Elymus arenarius* L.
*Poa trivialis* L.
*Carex vesicaria* L., var. *alpigena*, Fries.
*Lloydia serotina* (Sweet) Reichenb.
*Iris sibirica* L.
*Arenaria peploides* L.
*Eutrema arenicola* Hook.
*Spiraea betulifolia* Pall.
*Rubus arcticus* L.
*Epilobium latifolium* L.
*Vaccinium Vitis-Idaea* L.
*Trientalis europaea* L. var. *arctica* Ledeb.
*Gentiana glauca* Pall.
*Polemonium coeruleum* L.
*Pinguicula villosa* L.
*Chrysanthemum arcticum* L
*Artemisia Tilesii* Ledeb.

## Kotzebue Sound

The flora of the region about the head of Kotzebue Sound is hardly less luxuriant and rich in species than that of other points, visited by the "Corwin," lying several degrees farther south. Fine nutritious grasses suitable for the fattening of cattle, and from two to six feet high, are not of rare occurrence on meadows of considerable extent, and along stream-banks wherever the stagnant waters of the tundra have been drained off, while in similar localities the most showy of the arctic plants bloom in all their freshness and beauty, manifesting no sign of frost, or unfavorable conditions of any kind whatever.

A striking result of the airing and draining of the boggy tundra soil is shown on the ice-bluffs around Eschscholtz Bay, where it has been undermined by the melting of the ice on which it rests. In falling down the face of the ice-wall it is well shaken and rolled before it again comes to rest on terraced or gently sloping portions of the wall. The original vegetation of the tundra is thus destroyed, and tall grasses spring up on the fresh, mellow ground as it accumulates from time to time, growing lush and rank, though in many places that we noted these new soil-beds are not more than a foot in depth, and lie on the solid ice.

At the time of our last visit to this interesting region, about the middle of September, the weather was still fine, suggesting the Indian summer of the Western States. The tundra glowed in the mellow sunshine with the colors of the ripe foliage of vaccinium, empetrum, arctostaphylos, and dwarf birch; red, purple, and yellow, in pure bright tones, while the berries, hardly less beautiful, were scattered everywhere as if they had been sown broadcast with a lavish hand, the whole blending harmoniously with the neutral tints of the furred bed of lichens and mosses on which the bright leaves and berries were painted.

On several points about the sound the white spruce occurs in small, compact groves within a few miles of the shore; and pyrola, which belongs to wooded regions, is abundant where no trees are now in sight, tending to show that areas of considerable extent, now treeless, were once forested.

The plants collected are:

*Luzula hyperborea* R. Br.
*Allium schoenoprasum* L.
*Salix polaris* Wahlenb.
*Polygonum viviparum* L.
*Stellaria longipes* Goldie.
*Cerastium alpinum* L. var. *Behringianum* Regel.
*Papaver nudicaule* L.
*Saxifraga tricuspidata* Retz.
*Potentilla anserina* L. var.
" *biflora* Willd.
" *fruticosa* L.
*Lupinus arcticus* Watson.
*Hedysarum boreale* Nutt.
*Empetrum nigrum* L.
*Pyrola rotundifolia* L. var. *pumila* Hook.
*Arctostaphylos alpina* Spreng.
*Cassiope tetragone* (D. Don.) Desv.
*Ledum palustre* L.
*Vaccinium Vitis-Idaea* L.
*Vaccinium uliginosum* L. var. *mucronata* Herder.

*Armeria vulgaris* Willd. var. *arctica* Cham.
*Trientalis europaea* L. var. *arctica* Ledeb.
*Mertensia maritima* L. (S. F. Gray), Desv.
*Castilleia pallida* Kunth.
*Pedicularis sudetica* Willd.
" *verticillata* L.
*Galium boreale* L.
*Senecio palustris* Hook.

CAPE THOMPSON

The Cape Thompson flora is richer in species and individuals than that of any other point on the Arctic shores we have seen, owing no doubt mainly to the better drainage of the ground through the fissured frost-cracked limestone, which hereabouts is the principal rock.

Where the hill-slopes are steepest the rock frequently occurs in loose, angular masses, and is entirely bare of soil. But between these barren slopes there are valleys where the showiest of the arctic plants bloom in rich profusion and variety, forming brilliant masses of color—purple, yellow, and blue—where certain species form beds of considerable size, almost to the exclusion of others.

The following list was obtained here July 19:

*Cystopteris fragilis* (L.) Bernh.
*Trisetum subspicatum* Beauv. var. *molle* Gray.
*Glyceria*—
*Festuca sativa* (?) [F. *ovina* L.?]
*Carex rariflora* Wahlenb.
" *vulgaris* Fries, var. *alpina* (*C. rigida* Good.)
*Salix polaris* Wahlenb. and two other species undetermined.
*Polygonum Bistorta* L.
*Rumex crispus* L.
*Cerastium alpinum* L. var. *Behringianum* Regel.
*Silene acaulis* L.
*Arenaria verna* L. var. *rubella* Hook. f.
*Arenaria arctica* Stev.
*Stellaria longipes* Goldie.
*Anemone narcissiflora* L.
" *multifida* Poir.
" *parviflora* Michx.
" *parviflora* Michx. variety.
*Ranunculus affinis* R. Br.
*Caltha asarifolia* DC.
*Papaver nudicaule* L.
*Draba stellata* Jacq. var. *nivalis* Regel.
*Draba incana* L.
*Cardamine pratensis* L.
*Cheiranthus pygmaeus* Adams.
*Pedicularis capitata* Adams.
*Geum glaciale* Fisch.

*Nardosmia corymbosa* Hook.
*Erigeron Muirii* Gray n. sp.
*Parrya nudicaulis* (Boiss.) Regel, var. *aspera* Regel.
*Boykinia Richardsoni* Gray.
*Saxifraga tricuspidata* Retz.
" *cernua* L.
" *flagellaris* Willd.
" *davurica* Willd.
" *punctata* L.
" *nivalis* L.
*Dryas octopetala* L.
*Potentilla biflora* Willd.
" *nivea* L.
*Hedysarum boreale* Nutt.
*Oxytropis podocarpa* Gray.
*Epilobium latifolium* L.
*Cassiope tetragone* (D. Don.) Desv.
*Vaccinium uliginosum* L. var. *mucronata* Herder.
*Vaccinium Vitis-Idaea* L.
*Dodecatheon Meadia* L. var. *frigidum* Gray.
*Androsace chamaejasme* Willd.
*Phlox sibirica* L.
*Polemonium humile* Willd.
" *coeruleum* L.
*Myosotis sylvatica* var. *alpestris* Hoffm.
*Eritrichium nanum* Schrad. var. *arctioides.*
*Taraxacum palustre* DC.
*Senecio frigidus* Less.
*Artemisia glomerata* Ledeb.
" *tomentosa* [*tomentella* Trautv.?]

### Cape Prince of Wales

At Cape Prince of Wales we obtained:

*Tofieldia coccinea* Richards.
*Loiseleuria procumbens* Desv.
*Andromeda polifolia* L. *forma arctica.*
*Vaccinium Vitis-Idaea* L.
*Armeria arctica* (Wallr.) Stev.
*Androsace chamaejasme* Willd.
*Taraxacum palustre* DC.

### Twenty Miles East of Cape Lisburne

*Lychnis apetala* L.
*Anemone narcissiflora* L. var.
*Draba hirta* L.
*Saxifraga Eschscholtzii* Sternb.
" *flagellaris* Willd.
*Chrysosplenium alternifolium* L.
*Potentilla nivea* L.
" *biflora* Willd.
*Oxytropis campestris* DC.
*Primula borealis* Duby.
*Androsace chamaejasme* Willd.
*Phlox sibirica* L.
*Geum glaciale* Fisch.
*Erigeron uniflorus* L.
*Artemisia glomerata* Ledeb.

### Cape Wankarem, Siberia

Near Cape Wankarem, August 7 and 8, we collected:

*Elymus arenarius* L.
*Alopecurus alpinus* Sm.
*Poa arctica* R. Br.
*Calamagrostis deschampsioides* Trin.
*Luzula hyperborea* R. Br.
" *spicata* (DC.) Desv.
*Lychnis apetala* L.
*Claytonia virginica* L.
*Ranunculus pygmaeus* Wahlenb.
*Chrysosplenium alternifolium* L.
*Saxifraga cernua* L.
" *stellaris* L. var. *comosa*
*Saxifraga rivularis* L. var. *hyperborea* Hook.
*Polemonium coeruleum* L.
*Pedicularis Langsdorffi* Fisch.
*Nardosmia frigida* Hook.
*Chrysanthemum arcticum* L.
*Senecio frigidus* Less.
*Artemisia vulgaris* var. *Tilesii* Ledeb.

### Plover Bay, Siberia

The mountains bounding the glacial fiord called Plover Bay, though beautiful in their combinations of curves and peaks as they are seen touching each other delicately and rising in bold, picturesque groups, are nevertheless severely desolate-looking from the absence of trees and large shrubs, and indeed of vegetation of any kind dense enough to give color in telling quantities, or to soften the harsh rockiness of the steepest portions of the walls. Even the valleys opening back from the water here and there on either side are mostly bare as seen at a distance of a mile or two, and show only a faint tinge of green, derived from dwarf willows, heathworts, and sedges chiefly.

The most interesting of the plants found here are *Rhododendron kamtschaticum* Pall., and the handsome blue-flowered *Saxifraga oppositifolia* L., both of which are abundant.

The following were collected July 12 and August 26:

*Arenaria macrocarpa* Pursh.
*Aconitum Napellus* L. var. *delphinifolium* Ser.
*Anemone narcissiflora* L.
*Draba alpina* L.
*Parrya Ermanni* Ledeb.
*Saxifraga oppositifolia* L.
" *punctata* L.
" *caespitosa* L.
*Dryas octopetala* L.
*Oxytropis podocarpa* Gray.
*Rhododendron kamtschaticum*, Pall.

*Cassiope tetragona* (D. Don.) Desv.
*Diapensia lapponica* L.
*Gentiana glauca* Pall.
*Geum glaciale* Fisch.

## Herald Island

On Herald Island the common polar cryptogamous vegetation is well represented and developed. So also are the flowering plants, almost the entire surface of the island, with the exception of the sheer, crumbling bluffs along the shores, being quite tellingly dotted and tufted with characteristic species. The following list* was obtained:—

*Gymnandra Stelleri* Cham. & Schlecht.
*Alopecurus alpinus* Sm.
*Luzula hyperborea* R. Br.
*Salix polaris* Wahlenb.
*Stellaria longipes* Goldie var. *Edwardsii* T. & G.
*Papaver nudicaule* L.
*Draba alpina* L.
*Saxifraga punctata* L.
" *serpyllifolia* Pursh.
*Saxifraga sileniflora* (Hook.) Sternb.
*Saxifraga bronchialis* L.
" *stellaris* L. var. *comosa* Poir.
*Saxifraga rivularis* L. var. *hyperborea* Hook.
*Saxifraga hieracifolia* Waldst. & Kit.
*Potentilla frigida* Vill.?
*Senecio frigidus* Less.

## Wrangell Land

Our stay on the one point of Wrangell Land that we touched was far too short to admit of making anything like as full a collection of the plants of so interesting a region as was desirable. We found the rock formation where we landed and for some distance along the coast to the eastward and westward to be a close-grained clay slate, cleaving freely into thin flakes, with here and there a few compact, metamorphic masses that rise above the general surface. Where it is exposed along the shore bluffs and kept bare of vegetation and soil by the action of the

* Berthold Seemann, botanist of H. M. S. Herald in 1849, reported the finding of eight plants on a width of thirty feet of shore, which, he says, "was the whole extent we had to walk over." The plants were the following: *Artemisia borealis*, *Cochleria fenestrata*, *Saxifraga lamentiniana*, *Poa arctica*, and another undetermined grass, *Hepatica*, a moss, and red lichen covering the rocks. [Editor.]

ocean, ice, and heavy snow-drifts, the rock presents a surface about as black as coal, without even a moss or lichen to enliven its somber gloom. But when this dreary barrier is passed the surface features of the country in general are found to be finely moulded and collocated, smooth valleys, wide as compared with their depth, trending back from the shore to a range of mountains that appear blue in the distance, and round-topped hills, with their side curves finely drawn, touching and blending in beautiful groups, while scarce a single rock-pile is seen or sheer-walled bluff to break the general smoothness.

The soil has evidently been derived mostly from the underlying slates, though a few fragmentary wasting moraines were observed, containing traveled boulders of quartz and granite which doubtless were brought from the mountains of the interior by glaciers that have recently vanished—so recently that the outlines and sculptured hollows and grooves of the mountains have not as yet suffered sufficient post-glacial denudation to mar appreciably their glacial characters.

The banks of the river at the mouth of which we landed presented a striking contrast as to vegetation to that of any other stream we had seen in the Arctic regions. The tundra vegetation was not wholly absent, but the mosses and lichens of which it is elsewhere composed are about as feebly developed as possible, and instead of forming a continuous covering they occur in small separate tufts, leaving the ground between them raw and bare as that of a newly ploughed field. The phanerogamous plants, both on the lowest grounds and on the slopes and hilltops as far as seen, were in the same severely repressed condition, and as sparsely planted in tufts an inch or two in diameter, with from one to three feet of naked soil between them. Some portions of the coast, however, farther south, presented a greenish hue as seen from the ship at a distance of eight or ten miles, owing no doubt to vegetation growing under less unfavorable conditions.

From an area of about half a square mile the following plants were collected:

*Gymnandra Stelleri* Cham. & Schlecht.
*Poa arctica* R. Br.
*Aira caespitosa* L. var. *arctica.*
*Alopecurus alpinus* Sm.
*Luzula hyperborea* R. Br.
*Stellaria longipes* Goldie var. *Edwardsii* T. & G.
*Cerastium alpinum* L.
*Anemone parviflora* Michx.
*Papaver nudicaule* L.
*Draba alpina* L.
*Cochlearia officinalis* L.
*Saxifraga flagellaris* Willd.
*Saxifraga stellaris* L. var. *comosa* Poir.
*Saxifraga sileniflora* (Hook.) Sternb.
*Saxifraga hieracifolia* Waldst. & Kit.
*Saxifraga rivularis* L. var. *hyperborea* Hook.
*Saxifraga bronchialis* L.
" *serpyllifolia* Pursh.
*Potentilla nivea* L.
" *frigida* Vill.? *
*Armeria macrocarpa* Pursh.
" *vulgaris* Willd.
*Artemisia borealis* (Pall.) Willd.
*Nardosmia frigida* Hook.
*Saussurea monticola* Richards.

## SOME FARTHEST NORTH LICHENS AND MOSSES OF THE PEARY ARCTIC EXPEDITION TO GRANT LAND IN 1906

By R. S. Williams

This small collection comes from near the known northern limit of vegetation, namely the north shore of Grant Land, N. Lat. about 82° 27′ to 82° 30′ and is chiefly interesting for that reason as the species are all common and widely distributed in somewhat lower latitudes. Quite a number of flowering plants occur in the same region, some 22 species being listed by Dr. Rydberg for Grant Land, see Torreya **11**: 249–259. 1911, and Torreya **12**: 1–11. 1912.

The cryptogams were sent to the Botanical Garden by the American Museum of Natural History, being obtained by Dr. L. J. Wolf in July, 1906, when a member of the Peary Arctic Expedition.

* "*Potentilla emarginata*, Pursh. A very dwarf form of this species from Wrangell Land was inadvertently named *Potentilla frigida* in the list of Muir's collection." (Note by Asa Gray in House Executive Document No. 44 (1884–85), p. 191.) [Editor.]

With one or two exceptions the specimens are depauperate and fragmentary but out of the rather mixed up material I have picked out and determined 9 species of lichens as follows:

35*c*. *Cladonia pyxidata* (L.) Fr.

35*b*. *Stereocaulon denudatum* Flk.

35*d*. *Pertusaria dactylina* (Ach.) Nyl.

Material poor but apparently this.

32. *Ochrolechia tartarea* (L.) Mass.

Apothecia with well developed spores.

35. *Parmelia conspersa* (Ehrh.) Ach.

32*a*. *Cetraria islandica delisei* (Bory.) Schaer.

32*b*. *Parmelia physodes* (L.) Ach.

31. *Alectoria ochroleuca* (Ehrh.) Nyl.

Also 35*a*. The most abundant and conspicuous species in the collection.

32*c*. *Caloplaca cerina* (Ehrh.) Zahlb.

With well developed spores.

Associated with the above were at least 8 species of mosses all sterile. Six of them seem to be as follows, two not being determined.

*Distichium capillaceum* (Sw.) B. S. G. Bry. Eur.

*Dicranum fuscescens* Turn.

*Dicranum bonjeani* De Not.

*Tortula ruralis* (L.) Ehrh.

*Polytrichum juniperinum alpinum* Schimp.

*Drepanocladus uncinatus* (Hedw.) Warns.

Of the two undetermined species one is possibly a small *Dicranum*.

New York Botanical Garden.

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# A SKETCH OF PLANT CLASSIFICATION FROM THEOPHRASTUS TO THE PRESENT*

By Alfred Gundersen



The history of plant classification begins with the ancients, but little progress was made till the time of the sixteenth century. Gradually the idea of natural affinity developed, but it was not till the nineteenth century, with the acceptance of the doctrine of evolution, that the significance of affinity was realized.

The present article mentions men and publications that have chiefly influenced the development of the classification of the higher plants. Thanks are due to Dr. C. S. Gager for the suggestion leading to these studies.

## Earliest Writers

Theophrastus, "first of real botanists in point of time," was born about 370 B.C. on Mitylene, the island off Asia Minor where Aristotle taught Alexander. Theophrastus became a pupil of Aristotle in Athens, and later his successor. He wrote on many subjects; his "History of Plants," the oldest botanical work in existence, has recently been translated into English. About five hundred species, chiefly cultivated plants, are taken up. "In considering the distinctive characters of plants and their nature," he writes, "one must take into account their parts, their qualities, the way in which their life originates, and the course which it follows in each case. . . . It has not been satisfactorily determined what ought and what ought not to be called parts of plants. . . . The most important classes of plants are tree, shrub, undershrub and herb." Of flowers he says:



* Brooklyn Botanic Garden Contributions No. 21.

[No. 10. Vol. 18 of Torreya, comprising pp. 197–211, was issued 19 November 1918.]

"Some are downy as mulberry, some leafy (with petals) as apple. Some consist of a single leaf as morning glory. The thistle has a flower attached to each seed." In his will Theophrastus bequeathed his garden to his friends and to all those who will spend their time with them in learning and philosophy, and expressed his desire to be buried there. Eighteen hundred years were to pass before more extensive botanical studies were made.

Dioscorides was a Greek physician of the first century A.D. From his writings it is evident that he traveled widely. His work on medical plants was considered an infallible authority for sixteen centuries; numerous editions and commentaries in many languages have been published.

Pliny the Elder was a Roman admiral, killed by the eruption of Vesuvius, A. D. 79. His interesting but inaccurate *Historia Naturalis* describes the world, heavenly bodies, geography, animals and plants, accompanied by numerous anecdotes. Books XII–XXVII deal with plants, especially trees and medicinal plants. "It now remains," he writes, "to speak of the vegetable productions of the earth . . . from the forest man first obtained his food . . . trees formed the first temples of the gods . . . the beech is dedicated to Jupiter," etc. The great prestige of Pliny's work was partly due to its being the only work of its kind in Latin.

Little was added to the knowledge of plants between the time of Theophrastus and the sixteenth century. During the middle ages, it has been said, the Arabs kept aflame the lamp of knowledge. Plant names such as oryza, alfalfa, alkanna and azedarac testify to their studies. Writings about plants were connected with their use in medicine, and often described magic and rites to be used in gathering or preparing the herbs. According to the curious doctrine of signatures, plants indicated their use in healing as, for example, by heart-shaped or liver-shaped leaves.

## Sixteenth Century

The herbalists of the Rhine, Brunfels, Bock, and Fuchs, called by Sprengel the German fathers of botany, were the first to make pictures and descriptions direct from nature. Otto Brunfels was a monk who embraced Protestantism and became a teacher. His *Herbarum Vivæ Icones* (1530) contains one hundred and thirty-five beautiful and naturalistic illustrations of plants from the Strasburg region. He often quotes Dioscorides, but does not realize that he deals with a different flora.

Leonard Fuchs, professor of medicine at Tübingen, made about five hundred drawings for his *Stirpium Historia*. The plants are arranged alphabetically by Greek names. "There is nothing in this life pleasanter and more delightful," he writes, "than to wander over woods, mountains and plains adorned with flowers and plants of various sorts and to gaze intently upon them."

Bock, or Tragus, criticized Fuch's alphabetical arrangement. In his *Neu Kreuterbuch*, with descriptions in German, he describes herbs, shrubs and trees "keeping together such forms as nature seems to have linked together by similarity of form." The shape of leaves, branching, roots, size and color of flowers, but not their structure, were noted. "Mushrooms," he says, "are neither herbs nor roots, neither flowers nor seeds, but merely the superfluous moisture of the earth and trees." It was generally understood ferns had no seeds; for four years, Bock says, he kept vigil all midsummer night, and always found very minute black seeds on the pieces of cloth he had placed under the plants; moreover, he employed no cabalistics, conjurings or magic of any kind.

The *Botanologicon* by Euricius Cordus is an interesting account of an imaginary conversation about plants between Cordus and his friends. It clearly explains that the plants of the ancients do not grow in Central Europe. His son, Valerius Cordus, lectured on botany in Wittenberg but died of fever in Rome when only twenty-nine. His works were published after his death. He urged botanists to cease copying the descriptions of the ancients and to describe anew from nature. According to Tournefort, he was "the first of all men to excel in plant description."

In Italy Andrea Cesalpini published *De Plantis Libri XVI* in

1583. The introduction, of thirty pages, is a general discourse on plants. Woody plants and herbs are fundamental groups, he says, because taking food up through the stem is the first function of plants. The second function is reproduction, therefore fruit and seed characters should be considered next.

Lobelius, of Lille, distinguished groups by leaves, and thus roughly separated dicotyledons and monocotyledons.

### Seventeenth Century

The important work, *Pinax Theatri Botanici* (1623), by Gaspard Bauhin, of Basel, described more than six thousand species of plants, many more than any previous book. Genera are named with synonyms, without being characterized. Species are tersely described: root, leaves, flowers, fruit and seed in order. There are no larger groups, but the arrangement implies a classification: such groups as grasses, lilies, shrubs and trees, and seaweeds are kept together. Corals and sponges are still classed as plants.

The *Isagoge Phytoscopia* by Joachim Jung, of Hamburg, was published after his death. He was the first to state that woody plants and herbs should not form a fundamental division. This important point was ignored until the time of the Jussieus.

The perfecting of the microscope and anatomical studies, begun by Malpighi in Italy and Grew in England, prepared the way for greatly improved systems. Grew called attention to the importance of the number of cotyledons. Stamens are called the attire, flowers the lodging and dining room of insects. Later he said stamens are male organs. About the same time Camerarius of Tübingen first conducted experiments proving that pollen is needed to produce perfect seeds. His important work passed almost unnoticed for a century.

John Ray retained woody plants and herbs as main divisions, although reprinting Jung's work in the preface to his great Historia Plantarum. This work, the publication of which was begun in 1686 (a year before Newton's *Principia*), was intended to describe all plants known. Following Grew's suggestion he established the groups monocotyledons and dicotyledons as subdivisions of herbs. This important improvement was ignored by Tournefort and Linnaeus. His final groups (1703) were:

- HERBAE
  - Flore destitutae
  - Floriferae
    - Dicotyledones
    - Monocetyledones
- ARBORES
  - Flore a fructo remoto
  - Flore fructui contiguo

Ray's German contemporary and opponent, Rivinus, advocated binomial nomenclature. Magnol, of the Paris School of Medicine, was the first to use the term "family." "I think I can perceive in plants a certain affinity between them," he writes, "so that they might be ranged in different families, as we class animals. . . . There is a certain affinity, as it were, which does not exist in any of the parts considered separately, but only as a whole."

Tournefort was professor of botany at the Jardin du Roi, under Louis XIV. His botany was in many respects less satisfactory than that of Ray. He emphasized characters of the corolla. The very clear arrangement, particularly of genera, made his *Institutiones Rei Herbariae* (1700) very suitable for reference; it became the standard authority until the time of Linnaeus. His groups are:

- HERBAE
  - Petalodes
    - Simplices Monopetali
    - Simplices Polypetali
    - Compositi
  - Apetali
- ARBORES
  - Apetali
    - Apetali
    - Amentacei
  - Petalodes
    - Monopetali
    - Polypetali

## EIGHTEENTH CENTURY

Vaillant, pupil of Tournefort, in 1717 called attention to Grew's views about anthers, and urged that stamens and pistils are the essential parts of flowers.

Carl Linné, second father of botany, generally known as Linnaeus, was born in 1707, the same year as Buffon and Bernard de Jussieu. His father was a country minister in southern Sweden. He made little progress in other studies, but early displayed his love and knowledge of plants. After years of struggle with poverty he went to Holland; here were published the famous *Systema Naturae* and *Genera Plantarum.* At thirty-five he became professor of botany in Upsala, the chief university of Sweden. Linnaeus was the first to adopt uniformly the binomial nomenclature for plants and animals, a reform almost at once generally adopted. By his "sexual system" plants are arranged simply according to the number of stamens and pistils, thus providing ready pigeon-holes for new species. His Species Plantarum (1753) is generally taken as the starting point for specific names. "There are as many species as were created in the beginning," Linnaeus says. Later in life he suggested that perhaps the genera only had been formed "in the beginning." He recognized his system as artificial; it was but a thread of Ariadne, to help him find his way in the labyrinth of facts. "A natural classification," he writes in the *Philosophia Botanica,* "is the first and last aim of systematic botany. I have long sought but have not been able to perfect it; I shall seek it as long as I live." The vegetable kingdom includes seven "families": fungi, algae, mosses, ferns, grasses, palms and plants. He then proposed sixty-seven "natural orders" (a few ending in *-aceae,* others in *-ales*). He does not describe them, but names their genera. "I will not give my reasons for the distribution of natural orders," he said to a pupil. "You or some other person after twenty or fifty years will discover them and see that I was right."

During the next hundred years a great number of works were published on the Linnaean system, especially in Germany and England.

In France the system was never established. "Why should a Linnaeus persuade us to call a dog *Canis familiaris?*" said Buffon. Adanson, in his Familles des Plantes also attacked Linnaeus;

there should be, he says, a great work describing all genera under the natural families.

Bernard de Jussieu attempted to lay out the Royal Gardens at Versailles by a natural system. Following Jung, he abandoned the groups woody plants and herbs. He adopted Linnaeus's natural families, but grouped these according to suggestions from Ray, Tournefort and his own observations. He was continually improving his system and did not publish anything. "What does it signify," he said, "who gets the credit, so long as the truth becomes known?" His nephew, Antoine Laurent de Jussieu (1748–1816) came to Paris to assist him, and further improved his uncle's system. At the outbreak of the French Revolution he published *Genera Plantarum secundum Ordines Naturalis Disposita*. The last sheets were drawn from the press on July 13, 1789, the day before the fall of the Bastille. His groups are:

Acotyledones (fungi, ferns, mosses, algae, and naiades, 1)
Monocotyledones (hypogynae, 2, perigynae, 3, and epigynae, 4)
Dicotyledones (apetalae, 5–7, monopetalae, 8–11, polypetalae, 12–14, and diclines irregulares, 15)

The numbers refer to his fifteen classes, under which one hundred families are distinguished, and under them the genera are described. His work was for long unfavorably received, the Linnaean system being more effective to find quickly the names of plants. The Jussieus are justly regarded as the founders of the conception of natural plant families, in fact of the first approximation to a natural classification.

(*To be continued*)

# FURTHER ADDITIONS TO THE FLORA OF WESTERN OREGON

By J. C. Nelson

In this journal for February, 1918, I printed a list of plants growing spontaneously within the limits of Piper & Beattie's Flora of the Northwest Coast that had not found mention in that manual. I ventured the assertion at the time that further field-work would materially add to this list, not only because of the rapid introduction of foreign species, but also because the geographical limits of many native forms are not clearly understood. The list which appears below, representing the result of another season's collecting, seems to show that my prediction was not wholly unjustified. In spite of the fact that I made only one trip this year that took me more than ten miles from home, the number of unreported species shows no falling off from previous years.

In the case of the foreign plants, there is nothing specially remarkable about this—in fact, it is what is taking place in much the same degree on the Atlantic seaboard. The weed-flora of all sections of the temperate zone tends toward a certain uniformity; and this tendency becomes more marked as means of transportation multiply. The process may be compared to the diffusion of a liquid through another medium—and the point of saturation is still far away. Individual species may appear and disappear, but the rising tide of the aggregate shows a steady increase.

The *native* species that have not appeared in previous lists seem to fall into two general classes: (1) Californian species that were thought not to extend north of the Umpqua Valley; (2) plants characteristic of the Upper Sonoran Zone east of the Cascades, which on account of the humidity of western Oregon were not expected to occur here. In regard to the first group, there is of course no *a priori* reason why the Californian flora may not extend beyond the limits assigned to it. The state line simply does not exist on a botanical map; and there is neither a mountain barrier difficult of passage, nor a thoroughgoing change of climatic and soil conditions to bar the way. The percentage of species that are typically Californian of course becomes steadily less as we advance northward; if 50 per cent of the Californian forms reach the Umpqua valley, not above 10 per cent are found in that of the Willamette; but there is no fixed point beyond which they totally disappear.

As for the second group, any attempt to determine the distribution of species in western Oregon on a purely zonal basis will prove unsatisfactory. In the arrangement of plant zones, that part of Oregon lying west of the Cascades has been assigned to the Humid Transition, while the Upper Sonoran is considered to exist east of the Cascades only. But this arrangement fails to take account of the fact that we have two very different types of climate in western Oregon. During nine months of the year we have heavy rainfall and high humidity; during the other three months the rainfall is negligible and the atmosphere becomes very dry. During this latter period the conditions of growth in the western valleys are almost identical with those which prevail in the semi-arid region east of the Cascades, and only the most strongly drought-resisting species are able to continue their growth. If therefore a characteristically Upper Sonoran species were introduced into the Willamette Valley at the beginning of the dry season, it would find no difficulty in adjusting itself to its environment; nor would the mild winter offer any serious obstacle to its survival. Certain localities in the region about Salem, where the soil is thin and rocky or gravelly, especially on slopes facing the west, offer conditions before the end of the long summer that are as truly Upper Sonoran as in any part of eastern Oregon. These conditions being uniform in these localities, one would expect the flora to conform; and as a matter of fact, there are localities about Salem where the flora differs very slightly from that of a similar area in the semi-arid districts. A zonal map that was wholly accurate would have its "Humid Transition" region thickly dotted over with larger or smaller patches of the color used for the Upper

Sonoran; and such a map would have little value unless it were made out in two forms—one for the wet and one for the dry season.

Specimens of all the plants named below, unless otherwise indicated, have been deposited in the Gray Herbarium. Mr. J. Francis Macbride has very kindly verified and corrected my determinations in the case of all except the sedges, which have been submitted to Mr. K. K. Mackenzie and remain in his possession. All these specimens were found growing spontaneously, and I have omitted several that, although common, seem still dependent upon cultivation. No species collected outside the limits of Piper and Beattie's Flora has been included.

1. *Equisetum hyemale* L. var. *robustum* (R. Br.) A. A. Eaton. In swampy ground two miles east of Brooks, Marion Co.
2. *Avena barbata* Brot. Common along the Southern Pacific right-of-way for three miles south of Salem, and occasional elsewhere along the railroad.
3. *Avena sativa* L. A common escape along railroads and in waste places.
4. *Deschampsia holciformis* (Presl) Steud. In dry soil about the lighthouse on Yaquina Head. Reported by Hitchcock from Garibaldi, Tillamook Co.
5. *Bromus polyanthus* Scribn. Common on street-parking and in waste ground about Salem.
6. *Puccinellia paupercula* (Holm) Fernald & Weatherby, var. *alaskana* (Scribn. & Merr.) Fern. & Weath. On beaches and tide-flats about Newport. Has been confused with *P. distans* (L.) Parl.
7. *Triticum aestivum* L. A common escape along railroads.
8. *Carex densa* Bailey. In hard dry soil by roadside, Eugene.
9. *Carex olympica* Mackenzie. Not uncommon in wet meadows and ditches.
10. *Carex unilateralis* Mackenzie. In dry ditch by roadside, one mile east of Salem.
11. *Carex tenera* Dewey. In a wet meadow near Loewi stop on Oregon Electric Ry., Marion Co.
12. *Carex angustior* Mackenzie. Rocky shore of Silver Creek above the Falls, Marion Co.

13. *Salix babylonica* L. A large tree in low ground near stream in pasture, three miles west of West Salem, Polk Co. No dwelling in the immediate vicinity. (Specimen deposited with the Arnold Arboretum.)
14. *Alnus rhombifolia* Nutt. Not infrequent in thickets along streams about Salem.
15. *Polygonum aviculare* L. var. *vegetum* Ledeb. In yards and waste places, Salem.
16. *Polygonum confertiflorum* Nutt. In dry soil, especially in dried mud, about Salem. Collected by Howell at St. Helens.
17. *Polygonum hydropiperoides* Michx. Common in slow streams and swampy ground.
18. *Spergularia sparsiflora* (Greene) A. Nels. Muddy tide-flats in Yaquina Bay, Toledo.
19. *Delphinium Nuttallianum* Pritzel. In ballast on S. P. tracks, one mile south of Salem.
20. *Delphinium depauperatum* Nutt. Not uncommon on gravelly prairies about Salem.
21. *Ionopsidium acaule* (Desf.) Reichenb. A common and troublesome weed in garden of Kerr estate, Elk Rock.
22. *Thysanocarpus curvipes* Hook. forma *madocarpus* (Piper) Macbr. Occasional in dry rocky soil.
23. *Brassica Rapa* L. Persisting in orchards and fields—very common.
24. *Brassica oleracea* L. var. *acephala* DC. Common in cultivation, and often persisting in fields, etc.
25. *Lepidium sativum* L. Occasional in old gardens about Salem.
26. *Peltiphyllum peltatum* (Torr.) Engler. Not collected, but observed from car-window along Mary's River in Benton Co. Very common in southwestern Oregon.
27. *Pyrus Malus* L. A common escape to thickets and roadsides.
28. *Rubus thyrsanthus* Focke. A frequent escape in dry sandy soil.
29. *Rosa canina* L. Not infrequent along streams and roadsides. —Forms not typical and identity in doubt.

30. *Potentilla canadensis* L. A form with double flowers, possibly a hybrid, is not infrequent on lawns and roadsides at Salem.
31. *Vicia tetrasperma* Moench. In gravel on railroad tracks, Sidney Marion Co.
32. *Vicia angustifolia* (L.) Roth, var. *segetalis* (Thuill.) Koch. In dry ground along railroad near Loewi stop, Marion Co. Also found on ballast at Linnton.
33. *Ailanthus glandulosa* Desf. Occasional on lawns and street-parking at Salem. The seedlings often bear flowers in their first year!
34. *Reseda alba.* L. Occasional in waste ground about Salem.
35. *Viola Sheltonii* Torr. In rich woods on west slope of Spencer's Butt, seven miles south of Eugene. A Californian species, but reported from the White Salmon Valley, Washington, by Suksdorf.
36. *Oenothera grandiflora* Ait. Common in vacant lots and alleys at Independence, Polk Co.
37. *Chaerefolium Anthriscus* (L.) Schinz. & Thellung. In tall grass in State Fair Ground, Salem.
38. *Scandix Pecten-Veneris* L. On railroad track near Chemawa, Marion Co. (Specimen in herb. Willamette University, Salem.)
39. *Apium graveolens* L. Occasional on rubbish-heaps about Salem.
40. *Ligustrum vulgare* L. An occasional escape to roadsides in Polk Co.
41. *Convolvulus polymorphus* Greene. In waste ground near railroad station, Salem. Common in southwestern Oregon.
42. *Myosotis arvensis* (L.) Hill. A weed in gardens, Salem.
43. *Amsinckia Menziesii* (Lehm.) Nels. & Macbr. Not uncommon in grain-fields and waste places. Most of what passes as *A. intermedia* F. & M. and *A. lycopsoides* Lehm; is to be referred here.
44. *Amsinckia arenaria* Suksd. Occasional on railroad tracks. Apparently a good species.

45. *Cryptantha flaccida* (Dougl.) Greene. In very dry soil on border of gravel pit, Salem. A typical Upper Sonoran plant.
46. *Cryptantha Torreyana* (Gray) Greene, var. *grandiflora* (Rydb.) Nels. & Macbr. Not infrequent in dry rocky woods.
47. *Allocarya californica* Greene. Not uncommon in wet places.
48. *Prunella vulgaris* L. The form on lawns about Salem seems to belong to the species rather than to any of the indigenous varieties.
49. *Prunella vulgaris* L. var. *calvescens* Fernald. In wet meadows north of Salem. A white-flowered form (forma *alba* J. C. Nels.) has also been collected.
50. *Linaria Elatine* (L.) Mill. Reported from Eugene by Mr. R. V. Bradshaw. I have seen a drawing only, but the spurred corolla, prostrate stem, hastate leaves and yellow-and-purple flowers seem to indicate this species.
51. *Collinsia Rattani* Gray. A single specimen, growing in gravel about the railroad station at Gerlinger, Polk Co. Evidently introduced, but indigenous southward.
52. *Veronica officinalis* L. In an old clearing in deep coniferous woods at Silver Creek Falls, Marion Co.
53. *Plantago subnuda* Pilger. On tide-flats in Yaquina Bay, Toledo.
54. *Plantago lanceolata* L. var. *lanuginosa* Mert. & Koch. On railroad tracks east of Salem; also in waste ground at Portland.
55. *Tragopogon pratensis* L. On refuse-heaps about State Prison, Salem.
56. *Agoseris heterophylla* Greene var. *normalis* Piper. Occasional on dry rocky hillsides in Polk and Marion Cos.
57. *Crepis setosa* Haller f. An abundant weed in waste places in Marion and Polk Cos.
58. *Eriophyllum ternatum* Greene. In a dry meadow, six miles southeast of Salem. Perhaps not distinct from *E. lanatum* (Pursh) Forbes.
59. *Calendula officinalis* L. A frequent escape to thickets and waste places about Salem.

60. *Achillea Millefolium* L. var. *nigrescens* E. Mey. Common on sand-dunes about Newport.
61. *Chrysanthemum maximum* Ramond. Common in cultivation, and frequently escaping to waste places, Salem.
62. *Artemisia Absinthium* L. Occasional in vacant lots, Salem.
63. *Senecio Bolanderi* Gray. On damp cliffs along the beach at Newport. Common in southwestern Oregon.
64. *Micropus californicus* Fisch. & Mey. Abundant on a dry rocky hillside six miles southeast of Salem. Also near Orville, Marion Co. Abundant in southwestern Oregon.
65. *Centaurea Jacea* L. In waste ground on campus of Willamette University, Salem.
66. *Centaurea consimilis* Boreau. In waste ground, Eugene. Also collected on ballast at Linnton.

Thirty-three of the above list, or exactly 50 per cent, are clearly introduced; the other 50 per cent seem to be native.

This list of 66 species, added to the 153 reported in my former article, gives a total of 219 species that find no mention in the latest manual professing to cover this region. About 125 of these, or approximately 57 per cent, may be regarded as introduced. The prediction that the original 1617 species of the Flora of the Northwest Coast could be raised to two thousand by a more thorough survey of the field seems nearer realization than ever; for there is no reason to suppose that the field has been yet exhaustively studied, or that the introduction of foreign species has been checked.

## REVIEWS

### Ferns of Tropical Florida*

One of the most interesting floristic regions of the United States is the southern tip of Florida, the only portion of our area in which the flora of tropical America is at all largely represented. No botanist knows this region so well as Dr. Small; and his summing up of our knowledge, to date, of even one of the predomi-

* Small, J. K. Ferns of Tropical Florida. Pp. ix + 80. 5 half-tone plates and 53 text-figures. New York, published by the author. 1918. Price $1.55.

nantly tropical groups occurring there—the ferns—is a welcome addition to his previous work on that locality. As a local flora should, the book gives, in an introduction, an account—and a very good one—of the geological, physical, and vegetational aspects of the Keys, to which Dr. Small limits "tropical Florida." There follows a systematic treatment of the 53 species of ferns and fern-allies known to grow there—a treatment abreast of the latest studies, with keys, full descriptions and notes on the mode of growth, habitat, time of discovery in Florida and range elsewhere of each species. These notes are not only interesting in subject-matter, but readable and attractive in style. Five half-tone plates of ferns *in situ*, from photographs by the author, form an excellent supplement to them. Furthermore, each species is illustrated in a text-figure, after the manner made familiar by the Illustrated Flora. There is probably no group of plants in which such illustration is of more value than in the ferns, where the characters necessarily used in the delimitation of species are often hard to describe intelligibly, but easy to picture. And no one could ask for better figures than Miss Mary E. Eaton has furnished—accurate, life-like and, in spite of their small size, beautifully clear in detail. Rarely, text and figures fail to agree. The sporophyll of *Lycopodium adpressum* figured on p. 65, for instance, is certainly not "abruptly subulate from a more or less toothed base"; but here the advantage seems to be with the artist rather than the author. There is also an ample glossary, a list of authors cited and a rather brief index.

Probably no book ever entirely suited its reviewers. From the point of view of the working systematist, amateur or professional, this shows one defect in technique surprising in a taxonomist of Dr. Small's keenness and long experience, and offers some opportunity for a homily on points of wider application than to it alone. The one new species proposed in the book (p. 31) is described in terms so general that anyone, on the evidence of the description alone, would be justified in reducing it to a synonym of *Pteris longifolia*, from which, as hitherto interpreted, it is a segregate. Moreover, the facts that it is such a segregate and that it includes, as it does, all the Florida material heretofore referred to *Pteris longifolia* are not mentioned at all.

This omission of the synonym is rather typical of much of Dr. Small's work. It would often be more intelligible nomenclatorially if unfamiliar segregates were better correlated with past usage and some reason given for shifts of name. One would like to know, for instance, why the name *Pycnodoria* is applied to the traditional *Pteris* and *Pteris* to *Pteridium;* but no hint of a reason is given.* The Illustrated Flora, a nomenclatorial pioneer in its field, printed a rather full synonymy and became thereby convincing where it was right and detectably wrong where it erred. In the absence of any adequate explanation, one must either accept the author's conclusions unquestioningly—and no true scientist desires that—or do over again much work which he has already done.

One feature which can go far to make or mar a manual is found in its keys. In this book they are, for the most part, adequate, but betray occasional weaknesses. Take the key to the orders on p. 2, for instance. Anyone unfamiliar with the plants would have his troubles in referring the average specimen to its proper order by such characters as these: "Vernation straight or inclined: prothallium subterranean, yellowish," and "Vernation circinate: prothallium terrestrial or epiphytic, green." They are, to be sure, the outstanding technical characters of the Ophioglossales and Filicales respectively; but a key is a practical device and is not required to furnish general definitions of the groups to which it leads. As it happens, the sole representative of the Ophioglossales among the species concerned is also the only dimorphic fern which has simple fertile segments and reticulate-veined sterile ones. Mention of this fact would have made the key readily workable. Again, on p. 4, "sporangia sessile on a filiform receptacle" and "sporangia borne on normal or modified leaf-blades" make no true contrast. The sporangia are also on leaf-blades in the first case. The principal headings

* The same is true of Dr. Britton's Flora of Bermuda, where this use of the two names appears, so far as I have observed, for the first time.

in the key to the species of *Tectaria* (p. 45) are based on one character hard to make out and another which is inconstant. As the figure testifies, the basal lobes of *T. minima* are as often as not much smaller than the terminal lobe. The key to these species in the Flora of the Southeastern United States is better; a still better one could be made by utilizing characters of root-stock, shape of areolae and indusium. I have dwelt in some detail on this point, a minor one so far as the present work is concerned, because carelessly made and inaccurate keys constitute a serious defect in a good deal of present-day systematic work. The making of a good and practicable key takes time and labor—more, apparently, than many authors are willing to put into it; but it is time well spent. For not only are good keys a vast aid and comfort to the user of them, but their making clarifies, as perhaps nothing else will, the author's own conceptions of species and groups.

I have ventured on so much of criticism, on somewhat technical lines, because it is of rather broad application. If it has assumed too great a prominence, I am sorry. For Dr. Small's little book, dealing from full knowledge with a region of especial interest, has a very real value to the student of plant distribution; and for fern-lovers who go south, it leaves little to be desired. Their only regret will be that he did not extend it to cover the ferns of all Florida.

C. A. WEATHERBY

**Billy, the Boy Naturalist***

To those brought up in the city, or worse still in the sophisticated suburbs, the production of a book like this, and the mental vista of its writer back to wholesome outdoor memories is at once a joy and a despair. Few can have such a fragrant memory of youthful pleasures in the simple things of nature, and the loss to our viewpoint, if not in our powers of observation is never quite overcome.

* Murrill, W. A. Billy, the Boy Naturalist, the true story of a naturalist's boyhood in Virginia just after the Civil War. Pp. 1–252 + 48 illustrations. W. A. Murrill, Bronxwood Park, N. Y. City. 1918. Price $1.50.

Little needs to be said about the book itself—it is frankly autobiographical. Most boys will read it with avidity, and quite unknown to themselves, with profit. So much juvenile reading is full of nonsense about animals and plants that a book by a trained naturalist that parents can rely upon is sure to find a field of usefulness.

In the preface the author says that the idea of the book came to him during a short illness when he was confined to his room, and where quiet reflection carried him back to the days of which he has so entertainingly written. Robert Louis Stevenson who knew something about illness, and boys, once wrote that they are naturally cruel and this book may well prove it. It is quite conceivable that once a boy got it in his mind that the book was produced during illness he might, even so, think to himself "I hope the author gets it again!"

N. T.

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## (1) BULLETIN

A monthly journal devoted to general botany, established 1870. Vol. 44 published in 1917, contained 579 pages of text and 26 full-page plates. Price $4.00 per annum. For Europe, 18 shillings. Dulau & Co., 47 Soho Square, London, are, agents for England.

Of former volumes, only 24–44 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–44 three dollars each.

Single copies (30 cents) will be furnished only when not breaking complete volumes.

## (2) MEMOIRS

The MEMOIRS, established 1889, are published at irregular intervals. Volumes 1–15 are now completed; No. 1 of Vol. 16 has been issued. The subscription price is fixed at $3.00 per volume in advance. The numbers can also be purchased singly. A list of titles of the individual papers and of prices will be furnished on application.

(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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New York City

Vol. 18 December, 1918 No. 12

# TORREYA

A MONTHLY JOURNAL OF BOTANICAL NOTES AND NEWS

EDITED FOR

THE TORREY BOTANICAL CLUB

BY

NORMAN TAYLOR

JOHN TORREY, 1796–1873.

CONTENTS



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# THE TORREY BOTANICAL CLUB




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# TORREYA

December, 1918

Vol. 18 No. 12

## A SKETCH OF PLANT CLASSIFICATION FROM THEOPHRASTUS TO THE PRESENT

By Alfred Gundersen

(Continued from November Torreya)

### Nineteenth Century

Augustin Pyrame de Candolle, of Geneva, greatly improved the limits and arrangement of families (then called orders). He increased their number to 161, as compared with Linnaeus's 67 and Jussieu's 100. Related families were called cohorts. As the conifers have more than two cotyledons, he adopted the term exogens instead of dicotyledons. His classification proposed in 1813 was:

| | |
|---|---|
| Vasculares | Exogenae (Diplochlamydeae and Monochlamydeae) |
| | Endogenae (Phanerogamae and Cryptogamae) |
| Cellulares | (Mosses, Algae, Fungi) |

The Monochlamydeae included the present gymnosperms and catkin-bearing dicotyledons. "I place dicotyledons first," he writes, "because they have the greatest number of distinct and separate organs. Then as I find families where some of these organs become consolidated, and consequently seem to disappear, I refer them to a lower rank. But let no one imagine I attach the least importance to the arrangement." The publication of the great *Prodromus* was continued for fifty years.

In Germany the Linnaean system was opposed by Schleiden, who called the productions of the Linnaean school "hay." Nägeli urged that the important thing is to make every conception find its place in connection with the rest of knowledge; he

[No. 11, Vol. 18 of Torreya, comprising pp. 213–230, was issued 16 December 1918]

made algae and fungi the starting point in the study of plant forms.

Robert Brown, called by Humboldt "easily the foremost of botanists," cared less about making collections than about the solution of problems. After travelling in Australia he published researches on cycads and conifers (1827), pointing out the character of gymnospermy, and the fact that the endosperm in these plants is formed before fertilization. They are thus entirely distinct from dicotyledons; a fact strongly confirmed by the antiquity of their fossils.

About this time numerous systems were proposed. In Bartling's *Ordines Naturales Plantarum* (1830) small groups of families are called classes, and their characters are given. The main groups are:

$$\begin{array}{ll}\text{CELLULAR} & \text{(Fungi, Lichens, Algae, Musci)}\\ \text{VASCULAR} & \left\{\begin{array}{l}\text{Cryptogamic}\\ \text{Phanerogamic}\left\{\begin{array}{l}\text{Monocotyledons}\\ \text{Dicotyledons}\end{array}\right.\end{array}\right.\end{array}$$

The monocotyledonous families are in ten classes, beginning with Gramineae and Cyperaceae. The dicotyledons are in four divisions: first, plants "with embryo in a vitellus," *Aristolochia*, Piperaceae, Nymphaeaceae, and others. The apetalous plants include Coniferae, with four families, Amentaceae, with five families (Casuarinaceae, Myricaceae, etc.), and ending with Salicaceae as a separate "class." The Monopetalae begin with Aggregatae and Compositae, the Polypetalae with Lorantheae and Umbelliflorae.

Endlicher's extensive *Genera Plantarum* (1836–1840) also begins with the lower plants, thus:

$$\begin{array}{ll}\text{THALLOPHYTA} & \text{(Algae, Lichens, Fungi)}\\ \text{CORMOPHYTA} & \left\{\begin{array}{ll}\text{Acrobrya} & \text{(Mosses, Ferns, Cycads)}\\ \text{Amphibrya} & \text{(Gramineae to Palmae)}\\ \text{Acramphibrya} & \left\{\begin{array}{l}\text{Gymnospermae}\\ \text{Apetala}\\ \text{Gamopetala}\\ \text{Dialypetala}\end{array}\right.\end{array}\right.\end{array}$$

The Apetala begin with Chloranthaceae and Piperaceae. He considers the Leguminosae as the most advanced type of all. Endlicher's system became much used in Germany.

Adolphe Brongniart, one of the first to study fossil plants, in 1843 introduced gymnosperms as a group of dicotyledons, thus:

| | |
|---|---|
| CRYPTOGAMAE | (Amphigenae and Acrogenae) |
| PHANEROGAMAE | Monocotyledonae<br>Dicotyledonae (Angiospermae and Gymnospermae) |

His two main divisions of flowerless and flowering plants have come into general use; these groups now appear less natural than those of de Candolle. Many botanic gardens in France, including that of Paris, are laid out by his system. Lindley arranged families into alliances, terminating uniformly in *-ales;* his main groups, Thallogens, Acrogens, Rhizogens, Endogens, Dictyogens, Gymnogens, and Exogens were unfortunate. His system was used for some time in England.

The far-reaching studies of Hofmeister, who was, according to Bonnier, perhaps the greatest genius of botanical science, were begun when he was a music dealer in Leipzig. He followed in detail the development of mosses, ferns, and seed plants, and for the first time made clear the importance of the phenomenon of alternation of generations, and the essential unity running through the various groups of plants. From this time more attention is given to the structure of flowerless plants.

The early system-makers seized upon more or less arbitrary characters which they considered fundamental. Their systems emphasized differences, and were often very effective to find the names of plants. The work of Hofmeister emphasized resemblances, implying, though not stating, the doctrine of evolution. The growth of knowledge in other sciences of nature also gradually prepared the way for acceptance of evolution instead of special creation. Darwin's famous work on the "Origin of Species" (1859) became a subject of general controversy. "Although fully convinced of the truth of these views," says Darwin, "I by no means expect to convince experienced naturalists." His ideas were defended in this country by Asa Gray, and strenuously opposed by Agassiz. Schimper, whose name is associated with the doctrine of phyllotaxis, says "Darwin's doctrine of breeding is the most short-sighted possible, most stupidly mean and brutal." Of species-making Darwin says he does not think more credit should be given to a naturalist for describing a species than to a carpenter for making a box. Impressed by the difficulties of nomenclature, he left a provision in his will which resulted in the preparation of the "*Index Kewensis*" of flowering plants (1885).

Alexander Braun, nature-philosopher and botanist, combined suggestions from Brown, Endlicher and others and in 1864 proposed the groups:

| | | |
|---|---|---|
| BRYOPHYTA | (Algae, Fungi and Moss-like Plants) | |
| CORMOPHYTA | (Ferns and Club-mosses) | |
| ANTHOPHYTA | Gymnospermae (Frondosae and Acerosae) | |
| | Angiospermae (Monocotyledons and Dicotyledons) | |

Thus the old groups based on cotyledons were subordinated to the division gymnosperms and angiosperms, and the importance of Robert Brown's discovery at last recognized.

Sachs, in the first edition of his *Lehrbuch* (1868), adopted five principal groups—Thallophyta, Characeae, Muscineae, Vascular Cryptogams, Phanerogams. His idea of the Linnaean school is expressed in his "History of Botany": "A mass of lifeless phrases was the instruction offered to the majority of students under the name of botany, with the inevitable effect of repelling the more gifted natures from the study. This was the evil result of the old notion that the sole or chief business of every botanist is to trifle away time in plant collecting in wood and meadow, and in rummaging in herbaria. Even the better sort lost the sense for higher knowledge while occupying themselves in this way with the vegetable world. The powers of the mind could not fail after a time to deteriorate and every textbook of the period supplies proof of this deterioration."

Following a series of colonial floras, Bentham and Hooker prepared their great work, *Genera Plantarum* (1862–1881). It describes with great detail all genera of seed plants, "the greater portion," Hooker writes, "being the product of Bentham's indefatigable industry." The arrangement is in the main that of de Candolle, the main divisions being:

DICOTYLEDONES (Polypetalae, Gamopetalae and Monochlamydeae).

GYMNOSPERMEAE.
MONOCOTYLEDONES.

It is interesting to note that while in the text gymnosperms are implied to be included in dicotyledons, in the list of contests they are put up as a separate group. Bentham and Hooker's system was followed in Gray's "Manual," including the sixth edition. There gymnosperms are retained under dicotyledons, but the interesting suggestion is made that it would be more natural to place endogens at the beginning, that is, dicotyledons between monocotyledons and gymnosperms.

Eichler's studies on the structure of flowers made more definite groups of related families, now called orders. His classification was a combination of previous systems, thus:

$$\text{CRYPTOGAMAE}\begin{cases}\text{Thallophyta}\\ \text{Bryophyta}\\ \text{Pteridophyta}\end{cases}$$

$$\text{PHANEROGAMAE}\begin{cases}\text{Gymnospermae}\\ \text{Angiospermae}\begin{cases}\text{Monocotyleae}\\ \text{Dicotyleae (Choripetalae}\\ \quad\text{and Sympetalae)}\end{cases}\end{cases}$$

The Choripetalae begin with catkin-bearing trees and end with the pea family; the Sympetalae end with the composites. The last family with its condensed inflorescence, united petals and anthers, and inferior ovary, is considered as the culmination of evolution of the dicotyledons.

*Die Naturlichen Pflanzenfamilien*, the great coöperative work edited by Engler and Prantl, appeared in the last decade of the nineteenth century and is as yet the most complete exposition of the plants of the world as a whole. The main groups adopted were Myxothallophyta, Euthallophyta, Embryophyta zoidiogama (Bryophyta and Pteridophyta), and Embryophyta siphonogama (Gymnospermae and Angiospermae). Later in the *Syllabus der Pflanzenfamilien* the Thallophyta have been broken up into many groups. The angiosperms are arranged as follows:

MONOCOTYLEDONEAE: First, plants with the number of floral parts indefinite, as in the arrowhead; then those with the number definite, as in the lily.

DICOTYLEDONEAE: *Archichlamydeae*, petals none or separate. First, Casuarina and other plants with perianth absent or single: mostly catkin-bearing, wind-pollinated trees, as oak. Under flowers with distinct calyx and corolla come those with axis-like receptacle, such as buttercup, and those with cup-like receptacle, as rose; last, those with inferior ovary, as evening primrose.

*Metachlamydeae*, petals united, grouped by the number of staminate whorls and the position of the ovary.

"Engler has evidently abandoned the attempt to produce a phylogenetic system," says Lotsy, " and has been content to establish a readily understood morphological system of the plant world which may be the least affected by constantly changing phylogenetic views."

With the completion of the *Pflanzenfamilien* botanists had for the first time available an extensive connected account of all groups of plants, a fact which has brought to the system there adopted wide international sanction. Minor changes have been introduced in successive editions of the *Syllabus*.

## RECENT STUDIES

A few developments of recent years, of special interest, may be mentioned. With the spread of the doctrine of evolution has grown the ideal of a single system, a truly natural classification of plants and animals which shall exhibit the course of evolution of the forms of life on the earth.

Bower has given reasons to show that eusporangiate ferns, such as *Marattia* and *Botrychium*, must be considered more primitive than the leptosporangiate forms, such as Polypodiaceae, a view that has gained wide acceptance though not adopted by Engler and Gilg.

The relation of gymnosperms to ferns was supported by the discovery of ciliated sperm-cells in *Ginkgo*, by Hirase, in 1895; later similar discoveries were made in cycads. This relation was confirmed by the finding of fossil seed-bearing ferns by Oliver and Scott, in 1903. The ferns now connect so closely with the higher plants that the old grouping Pteridophyta and Spermatophyta is no longer justified.

In 1900 Jeffrey proposed two main groups of vascular plants: *Lycopsida* (club-mosses and horsetails) with continuous woody cylinder and sporangia on the ventral surface of the sporophylls, and *Pteropsida* (ferns, gymnosperms, and angiosperms), having woody cylinder with foliar gaps and sporangia on the dorsal surface of the sporophylls. Since the club mosses differ more from the horsetails than do the groups of the Pteropsida among themselves, Scott proposes three groups: Lycopsida, Sphenopsida (horsetails and sphenophylls), and Pteropsida. C. E. Bessey makes six groups of vascular plants, Lepidophyta, Calamophyta, and Pteridophyta, Cycadophyta, Strobilophyta (conifers) and Anthophyta (flowering plants). Following in part along lines suggested by Hallier, Bessey considers the monocotyledons as derived from dicotyledons, the latter forming two main lines: buttercup series, with receptacle an axis; and rose series, with receptacle more or less cup-shaped. Apetalous flowers are considered as reduced forms.

Van Tieghem has proposed a number of morphological systems in which the structure of the ovule is emphasized. "We may question, says Rendle in his "Classification of Flowering Plants," whether in view of the ephemeral nature of such systems, an author is justified in proposing so large a number of new terms."

Evidence appears increasingly conclusive that monocotyledons are derived from dicotyledons, and therefore should be placed after these. This view was already suggested by Strasburger, and has been developed by Miss Sargant, Hallier, and others. The probable line of development appears to be Ranunculaceae to Alismaceae. Another possible connection may be Piperaceae to Araceae, a view adopted by Lotsy. The Bentham-Hooker sequence is (1) dicotyledons, (2) gymnosperms, (3) monocotyledons; Engler's is (1) gymnosperms, (2) monocotyledons, (3) dicotyledons, while the right sequence appears now to be (1) gymnosperms, (2) dicotyledons, (3) monocotyledons.

This evidence has stimulated search for primitive angiosperms among the dicotyledons. According to one view, dicotyledons have arisen by the way of Gnetales to catkin-bearing trees, such as oak, the early dicotyledons being wind-pollinated, like the conifers. According to another view, forms like the fossil *Bennettites* gave rise to trees like magnolia; on this view the beginning of angiospermy is a response to insect pollination. It is not impossible that both of these lines may have been followed, in which case dicotyledons as a natural group would disappear. Herbaceous plants appear to have been derived from woody ancestors, following the coming of distinct seasonal changes on the earth.

The group Sympetalae seems likely later to be broken up to connect with various lower groups, some of the possible lines of connection being Caryophyllaceae—Gentianaceae, Cornaceae—Caprifoliaceae, Passifloraceae—Cucurbitaceae.

A general appearance of the great tree of plant evolution is thus gradually taking form, strongly supported in the case of vascular plants from fossil evidence. "The reconstruction of the pedigree of the vegetable kingdom," says Scott, "is a pious desire, which will certainly not be realized in our time."

Meanwhile must the confusion from an increasing multiplicity of systems in the various countries continue indefinitely? A complete natural system may indeed be distant, but for the progress of science, as well as for practical purposes, some degree of international uniformity is greatly to be desired.

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## LABRADOR TEA IN NEW JERSEY

By Kenneth K. Mackenzie.

On June 19, 1918, while going along the road at the northwesterly corner of Budd's Lake, I was joined by a resident of one of the houses along the road, Mr. M. E. Palmer. Conversation developed the fact that Mr. Palmer had made a business of collecting Sphagnum moss, and was well acquainted with a number of bogs in Morris County, New Jersey, and especially with the large one at the westerly end of Budd's Lake. Much to my satisfaction he joined me for the day, and under his guidance I got into the bog from the land side in several different places. There are some four or five separate open places on the westerly side of the lake which are separated from one another by small streams lined by very dense swampy thickets through which it is almost impossible to go. The easiest way of visiting the various open bogs is by way of a boat from the lake side, but it is possible to reach them all successively from the land side by obscure trails through the dense thickets. To get from one to the other, a person has however to go back each time a very considerable way from the lake margin in order to avoid the troublesome thickets above referred to.

This bog at Budd's Lake is by far the best open sphagnum bog which we have in northern New Jersey and contains in abundance a number of northern species which are either unknown in the State elsewhere or are very local. One of these local species is *Andromeda glaucophylla* Link., which is abundant in some of the openings. While looking at this Mr. Palmer asked me what was the plant which grew in similar places and looked a great deal like the *Andromeda* but had the leaves hairy beneath and had a very powerful odor. This question naturally interested me very much and I told him that the only plant which answered this description was Labrador tea (*Ledum groenlandicum*) and further that although this plant had been attributed to New Jersey for a number of years yet nobody knew of any definite station for it. It was vaguely attributed to Sussex County, but neither at the New York Botanical Garden nor at Harvard University was there any definite or further information available.

Mr. Palmer informed me that he knew of a spot north of Dover where it grew and promised to get some for me. True to his promise some ten days later a bundle came to me by mail containing specimens of the Labrador tea from the Station north of Dover.

As Mr. Palmer wished to show me the plant growing and I was very desirous of seeing it in New Jersey, we made arrangements to meet at the Dover railroad station on July 7, 1918. The day turned out to be a most pleasant one, and we went north from Dover towards Mt. Hope. We took woodland paths known to Mr. Palmer, and thus saved some distance, but for one not acquainted with these paths the way to go would be straight along the main road from Dover to Mt. Hope until one comes to the cross road about 1½ miles north of Dover station. Going east from this point to Rockaway this road is well travelled, but going west it is almost abandoned and largely overgrown with grass. However, the course is westward for about half a mile until one begins going down hill slightly, when one must go along an old woodland path due north through dense second growth woods for about half a mile more. The path to follow is along the westerly side and slightly below the top of the ridge and the point to be reached is about three-fourths of a mile due north of the figures 775 on the Geological Survey map, Lake Hopatcong quadrangle. Reaching this point one sees immediately west at the foot of the slope a dense swampy thicket with larch trees in the center. It would not be suspected that there is an opening in the center of this thicket and I do not believe that even a botanist would ever have thought of trying to penetrate it. But Mr. Palmer had known the interior of this swamp for years, and it was into it that he guided me. As the swamp is not a large one, it did not take very long to get through the thickets and into the center. I was much surprised to find how much open space there was in the center, and it certainly was a great pleasure to see the *Ledum* in abundance all over the northern end of the opening together with quantities of the small cranberry (*Oxycoccus palustris*) and small quantities of *Andromeda glaucophylla*. Coming out of the bog we got back on the woodland trail which curved around to the east and hit the Mt. Hope road some five eighths of a mile north of the cross-road. As a matter of fact the easiest way of getting to the bog is by going to this point on the Mt. Hope road and then going west, but it is not so easy to give precise directions for this course as for the other.

When we reached the Mt. Hope road Mr. Palmer pointed out a place where a house had once been, little more than a quarter of a mile from the bog we had visited, and told me that his father was born there, and how his father and himself through their searches for sphagnum had known of this bog for many years.

Palmer's bog, as I am calling this interesting locality, will in all probability remain permanently undisturbed, and as it is an easy trip from Dover should be visited by our New York botanists.

I might add that while Labrador tea is reported from New Jersey in Britton's & Brown's Illustrated Flora **2**: 557, yet Dr. Britton did not know of any definite locality for it, but was under the impression that his record must have come from Dr. Porter. The herbarium of the latter has however thrown no light on the point. Inquiry from Dr. Fernald as to the source of the record in Gray's Manual (7 Ed.) 630, brought back the answer that this record was taken from Dr. Britton. These inquiries by me were made when Mr. Taylor was getting up the data for his local flora; and as all my attempts to get information as to the occurrence of Labrador tea in New Jersey then proved fruitless, it will be easily understood how interesting it was to me to at last definitely know that this plant actually grew in the State.

## SHORTER NOTES

DOUBLE FLOWERS IN HEMEROCALLUS FULVA, LINN.—Because such never seems to have been previously recorded for the day lily (*Hemerocallus fulva* L.) and seems to have been infrequently observed in the Liliaceae as a family, the writer reports double flowers in this species. Observations based on six specimens collected from the premises of Prof. F. C. Nipher, Kirkwood, Mo., are given.

The perianth consists of 12 distinct segments, alternating with and overlapping one another. Stamens 12, two of which are borne on opposite segments of the perianth. Occasionally a small number of the stamens are aborted. Styles two in number, adjacent and united, but mostly aborted to a C-shaped or claw-shaped appendages. The plant is quite typical with regard to color.

Dissections revealed no sign of insect injury, etc., to which the double flowers might be attributed. The ovules appeared to be unusually minute. Observers of the particular group of plants in previous years stated they had never noted double flowers. Since it was found that botanical terminology supplies no technical term descriptive of this particular condition, there is suggested the term *diplous* (Greek—literally two-fold), as being advantageous.—N. M. GRIER.

## REVIEWS

### McAtee's Natural History of the District of Columbia*

The study of the vegetation or fauna of any area in the Eastern States is so likely to be bound up with the history of the region

* McAtee, W. L. A sketch of the natural history of the District of Columbia, together with an indexed edition of the U. S. Geological Survey's 1917 map of Washington and vicinity. Pp. 1–142 + 5 maps. Price $2.15 postpaid. May, 1918.

Published as No. 1 of the Bulletin of the Biological Society of Washington and to be secured only from them by purchase.

that it is curious to find such general neglect of this among writers on these subjects. Perhaps with this in mind the author of the present book has devoted nearly half of it to historical notes on the natural history of the region, before giving his descriptions in detail of the present distribution of life in the District of Columbia.

This section of the book is about forty pages long and includes "Piedmont Plateau and Coastal Plain," "Magnolia Bogs and their relation to the Pine Barrens," ending with a description of other types of collecting grounds in the District. Associations of plants and animals are dealt with in all these essays.

The indexed map of the region is quite the most complete thing of its kind that comes to mind. In the region near New York there are scores of old place names, now known only to the delving few, and that similar conditions prevail about Washington is proven by Mr. McAtee's map which incidentally furnishes a remedy for them that would be welcomed in New York.

In the historical part of the book the attempt to translate old references to plants into modern binomials has not always been happy, as for instance "yellow jessamine" (probably *Gelsemium sempervirens*) is in a footnote referred to *Bignonia radicans*, which is of course the Trumpet Creeper. It remains, however, that the volume, with its excellent bibliographies, both plant and animal, and its most generously indexed map, will be a boon to Washington naturalists and a model of the complete description of the natural history of an area meriting wide imitation.

N. T.

## PROCEEDINGS OF THE CLUB

### May 29, 1918

This meeting was held in the Morphological Laboratory of the New York Botanical Garden, beginning at 3:30 P.M. Ten persons were present with Vice-president Barnhart in the chair.

The minutes of the meetings of April 24 and May 14 were read and approved.

The following were elected to membership, subject to approval of the committee on admissions.

Mr. George Oberdorfer, 145th Street and Riverside Drive, New York City; Mr. Frank Parker, 51 West 37th Street, New York City; Mr. Harold C. Sands, 250 West 78th Street, New York City; Mr. Edward A. Wickham, 482 Broad Street, Newark, N. J.

The scientific program consisted of a paper by Dr. Francis W. Pennell on "A Collecting Trip to Colombia," an abstract of which follows:

A brief account was presented of the speaker's experiences in Colombia between July, 1917, and March, 1918. During the first portion of this time he had accompanied Dr. H. H. Rusby; after August 20, he was alone. Joint travel comprised the ascent of the Magdalena valley to Neiva, thence across the Eastern Cordillera to the hacienda of "Balsillas." Later travels were: about Bogotá; across the Eastern Cordillera to Villavicencio at the head of the plains of the Meta; to Fusagasugá and the Natural Bridges of Pandi; the ascent from San Lorenzo to the snow-crowned Paramo de Ruiz in the Central Cordillera; across the plains of Bolivar from Magangue to Monteria; up the Rio Sinu andascent of the Western Cordillera to the Paramo de Chaquiro. Throughout the portion of Colombia seen, phytogeographic areas are sharply marked; in the lowland into forest or prairie; upon the mountains into zones dependent upon altitude. The latter are homologous, yet at increasing elevation progressively different in composition, upon each of the three Cordilleras.

Adjournment took place at about 5 P.M.

MARSHALL A. HOWE,
*Secretary pro. tem.*

OCTOBER 8, 1918

The meeting was held in the lecture room of the Department of Botany, Columbia University. President Richards opened the meeting at 8:15 P.M. There were fifteen persons present. The minutes of May 29 were approved. The following persons were nominated for membership: Mr. Cecil Billington, Detroit, Mich., Dr. L. C. Petry, Syracuse University, Syracuse, N. Y., Prof. J. F. Rock, College of Hawaii, Honolulu, Hawaii, Mr.

E. Eddy, Bangor, Me., Mr. Humbert Viola, Commercial Ave., Cliffside Park, N. J., Miss Hester Rusk, Barnard College, N. Y. City, and Miss Margaret Ritchie, 77½ South 10th Street, Newark, N. J. These persons were elected subject to the approval of the Committee on Admissions.

The program consisted of "A Resumé by Members of Summer Experiences." Prof. R. A. Harper exhibited a number of specimens of various species of *Peridermium* collected in South Carolina, Florida, and Mississippi during the spring months. He called attention to the great variety of forms of *P. cerebrum* as it occurs on different species of pine and compared them with species from the New Jersey Pine Barrens and Virginia.

Dr. F. J. Seaver spoke of collecting *Aleuria bicucullata* on the Palisades. This is a rare species of Discomycete collected only twice previously in North America. One collection being made in Wisconsin and the other in Ontario.

Dr. T. E. Hazen spoke of his work on collections of the narrow-leaved form of the *Pontederia*, which he is studying and asked for information regarding places where this form may be found. Miss Daisy Levy and Mr. A. T. Beals reported on mosses collected by them during the summer.

Miss Hester Rusk gave an account of her experiences at the University of Wisconsin during the summer.

B. O. Dodge spoke of his work on an investigation of the diseases of small fruits of the New York markets.

Prof. H. M. Richards reported on further investigations of the acidity of plants which he has been carrying on at the Desert Laboratory, Tucson, Arizona, and in California.

Adjournment followed.

B. O. Dodge,
*Secretary.*

## DATES OF PUBLICATION


| | | | | |
|---|---|---|---|---|
| No. 1, | for January | Pages 1–20 | Issued February | 13, 1918 |
| No. 2, | February | 21–40 | March | 8, 1918 |
| No. 3, | March | 41–64 | April | 10, 1918 |
| No. 4, | April | 65–80 | May | 8, 1918 |
| No. 5, | May | 81–100 | June | 4, 1918 |
| No. 6, | June | 101–126 | July | 8, 1918 |
| No. 7, | July | 127–156 | August | 15, 1918 |
| No. 8, | August | 157–176 | September | 7, 1918 |
| No. 9, | September | 177–196 | October | 29, 1918 |
| No. 10, | October | 197–211 | November | 19, 1918 |
| No. 11, | November | 213–230 | December | 16, 1918 |
| No. 12, | December | 231—— | January | 20, 1919 |


## ERRATA

Page 183, 6th line from bottom, for *parterae* read *porterae*.
6th line from bottom, for *cryx* read *oryx*.
5th line from bottom, for *Lygrocaris* read *Lygrocoris*.
3d line from bottom, for *sexes* read *species*.

# INDEX TO VOLUME EIGHTEEN

[The names of species and varieties described as new and of new combinations are in **bold face type.**]

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Of former volumes, only 24–44 can be supplied entire; certain numbers of other volumes are available, but the entire stock of some numbers has been reserved for the completion of sets Vols. 24–27 are furnished at the published price of two dollars each; Vols. 28–44 three dollars each.

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(3) **The Preliminary Catalogue of Anthophyta and Pteridophyta** reported as growing within one hundred miles of New York, 1888. Price, $1.00.

Correspondence relating to the above publications should be addressed to

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